THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 33 AUGUST, 1933 No. 5

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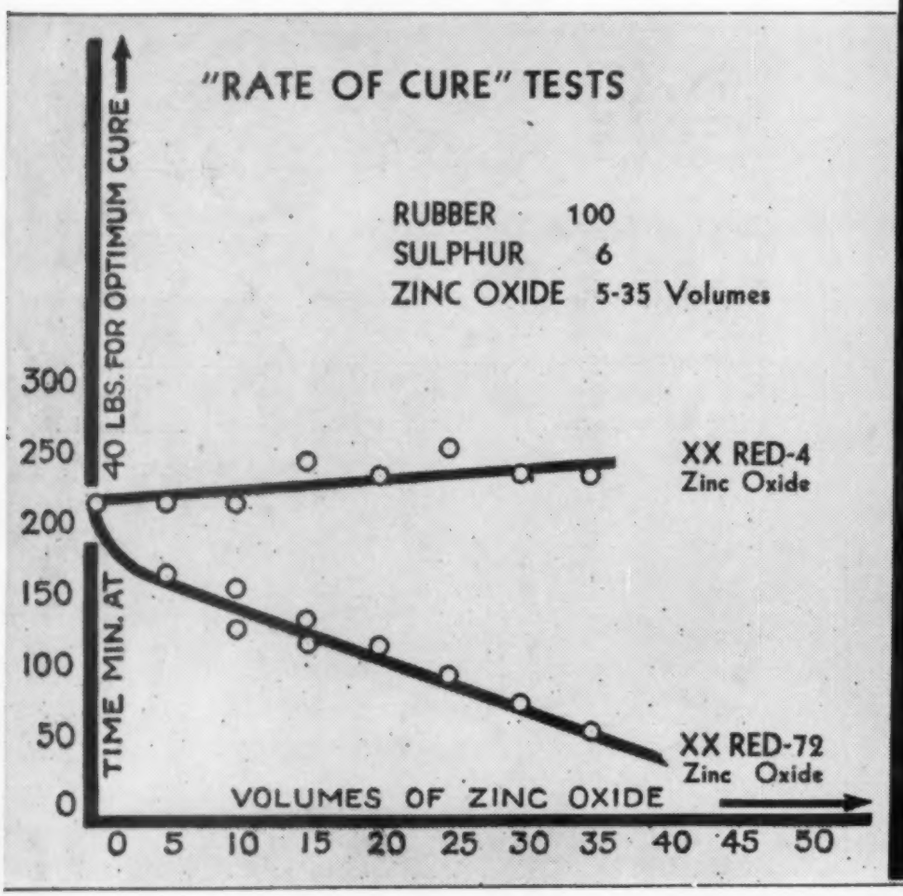
No. 18 of a series of charts showing a comparison of "fast" and "slow" curing zinc oxides with typical accelerators.

Note: XX Red 72 Zinc Oxide has pronounced accelerating properties; the effect is especially notable in the low volume loadings. XX Red 4 Zinc Oxide is practically without effect on the curing rate of a rubber-sulphur compound, except perhaps for a slight retardation in the higher volume.



The Accelerating properties of "FAST" (XX RED 72) compared with "SLOW" (XX RED 4) Zinc Oxide.

New Jersey zinc

THE NEW JERSEY ZINC COMPANY 160 FRONT STREET NEW YORK

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Vol. 33 AUGUST, 1933 No. 5

The Trend in RUBBER EQUIPMENT Development

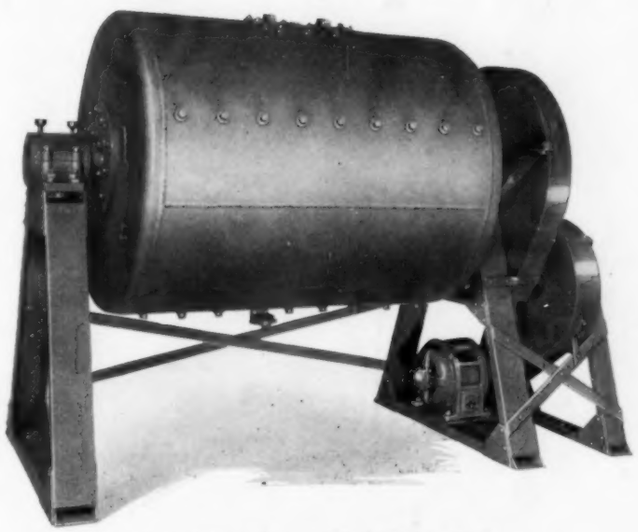
— By I. TORRENCE GURMAN*

FROM a factory viewpoint two things should concern the manufacturer most. They are first, the maintenance of production and quality and second, the alignment with product and process demands. The former is self-explanatory; the latter consists of the adoption of new processes and the addition of new items for which there is a demand, while at the same time dropping obsolete processes and items that are no longer in demand, or not sufficiently so as to warrant continued production.

The maintenance of production (and consequent low cost) is one of the major purposes of the manufacturer. Another of equal or even greater importance is the maintenance of quality. To go into a discussion of the merits of producing a uniform article would be to tread unnecessarily on a well-worn and time-proven path. Suffice it to say that the manufacturer who doesn't appreciate the value of building a uniform product, doesn't belong in the rubber business.

To assist him in attaining and increasing production and quality the manufacturer calls to his aid the benefits that are to be derived from the proper equipment, supervision and control. Between the technical and production men on the one hand, and the manufacturers of rubber working and controlling equipment on the other, much progress has been made in this direction, especially during the past five or six years.

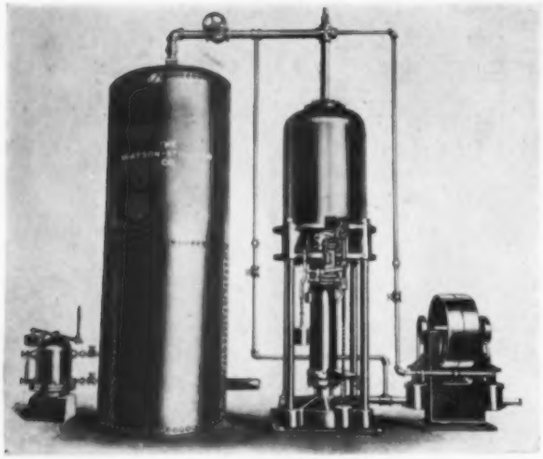
The necessity for more modern equipment and more accurate and dependable means of control has been due primarily to the material progress of the industry itself, and to the gradually widening scope of application of rubber goods, but the development of newer methods, coupled with increased competition and declined commodity prices have impelled lower production costs and higher specification requirements. This has resulted in an imperative necessity of more modern, more efficient and more dependable production machinery and more sensitive, more accurate and more fool-proof control methods and control instruments and equipment.



Revolving Churn (J. H. Day Co.)

Then again, the introduction—or rather the re-introduction—of latex as a basis for producing rubber goods, has opened up an entirely new field for the adoption of equipment of a nature formerly more native to the paper, paint,

*Consulting Rubber Engineer, 1 Wyeth St., Malden, Mass.

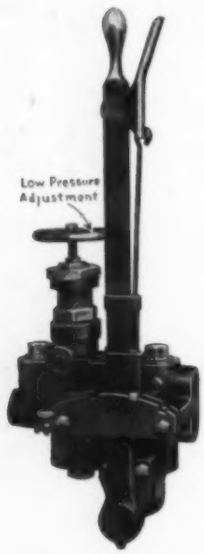


Hydro-Pneumatic Accumulator (Watson-Stillman Co.)

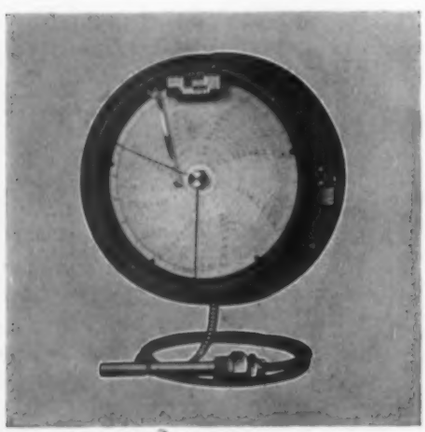
FIG. 3590

Shock Absorber to Prevent Shock and Alleviate Water Hammer in Hydraulic Accumulaotr Piping Systems (Hydraulic Press Mfg. Co.)

Automatic Pressure Regulator for Variable Pressure Operation of Presses (Hydraulic Press Mfg. Co.)



Poppet Valve for Applying Two Pressures to Presses (Hydraulic Press Mfg. Co.)



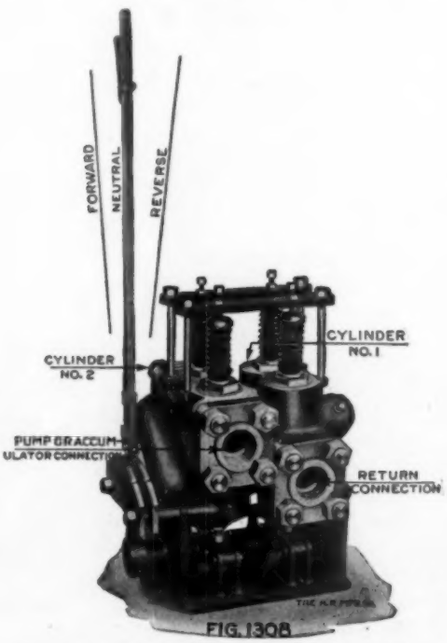
Recording Thermometer (Foxboro)

sugar and soap industry than to the rubber industry, with the corresponding control demand of new factors and new constants. With the resulting new conditions have come new problems in equipment layout and application, and technical men have been afforded the opportunity of applying their dormant knowledge of physical and electro-chemistry. Such influences and factors as viscosity, surface-tension, dispersions, suspensions, ion concentration, Brownian movement, particle size, atmospheric pressure, vapor tensions, opacity, absorption and adhesion have brought into the limelight and thrown haphazard at the technical and production men to be untangled and arranged in logical relationship and sequence. To their aid have come the manufacturers of specialized equipment such as paper-making machinery, ball and pebble mills, paint and pigment grinders, churning, mixing, filtering, spreading, drying, and humidifying equipment, with the benefit of their experiences in other industries where similar equipment has been adopted. Consequently, the rubber manufacturer has had to adopt this new equipment to appreciable extent.

Despite the progress made by latex and other dispersion applications, however, the production of rubber goods from coagulated rubber (crepe, sheet, para, etc.) is still by far of primary consequence, and the development of equipment in which milled rubber is used is therefore of major importance to the manufacturer.

In the development in control methods it has been desirous to effect the maintenance of uniform conditions and duplications of pressure, temperature, time, etc. Pneumatic, and two-stage accumulators, electraulic presses, hydraulic shock absorbers, hydraulic by-pass, double-acting and dual pressure valves and automatic pressure regulators have been introduced, and have resulted in more uniform means of applying direct pressure, while for the control of steam pressure (and corresponding temperature) accurate, sensitive reducing valves and electrically, thermal, and pneumatically operated control valves, and indicating and recording thermometers have been adopted.

The proper handling and treatment of the rubber stock has been facilitated by improvements in such "standard" equipment as presses, calenders, mills, and tubing and plas-

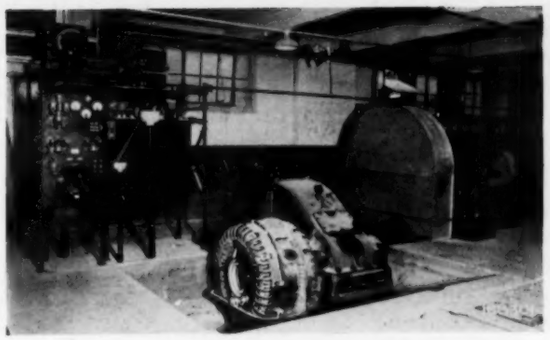


Four Way Balanced Poppet Type Valve for Double Acting Press (Hydraulic Press Mfg. Co.)

ticizing machines. Steel platens have consistently and continually replaced the heavy, cumbersome and less efficient cast iron ones in "even temperature" presses. In "hot and cold" presses the cast iron platen is obsolete. Self-opening, quick opening, and tilting-head presses have simplified operations and speeded up production. Redesign of worm and heating chambers of tubing machines have enhanced smooth extrusion and averted scorching due to local "hot spots." Instrument-control cooling of calender rolls has resulted in lower cost, and increased uniformity of calender stocks. Where thermal control is manual, the introduction of surface thermometers has been a great aid. This also applies to mills in which similar developments have been made. The introduction of newer types of rolls designed to better withstand the loads to which they are subjected and to facilitate thorough and accurate temperature adjustment, have aided considerably in achieving better calendering and milling conditions. The introduction of mechanical cutters on mills, assures the attainment and maintenance of duplicably uniform mixing, and reduced mixing time, in addition to giving the operator more free time and permitting him to operate more equipment at the same time, or to operate the same equipment more efficiently.

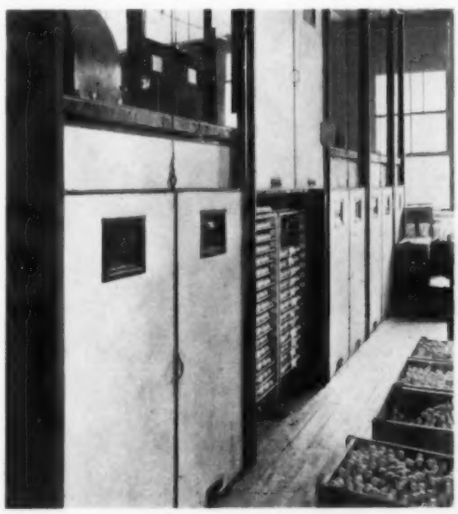
An example of a development in auxiliary equipment that has been well received in the rubber industry is the replacement of induction motors by synchronous for driving mills and calenders, either singly or in trains, using dynamic braking in place of the mechanical brake. This type of drive has so many factors in its favor that it will become, without doubt, universally adopted. Among its benefits are more uniformaly constant speed under varying load conditions, its adaptability to the synchronization of several operating stages, higher motor efficiency, reduction of plant power factor, reduction in "demand," and increased degree of safety. The first two are factors in favor of more uniform results, especially in the case of calendered stocks. In all plants where power is bought, low power factor or high demand are paid for in some form or other. The increase in power plant factor or lowered demand (or both) coupled with the higher efficiency of this type of motor, results in lowered power cost. Where the power is developed within the plant, the higher motor efficiency and the lowered plant power factor obtain, as does the consequent lowered power cost.

The dynamic braking reduces the possibility, number,

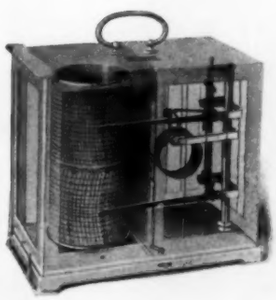


Synchronous Motor Mill Drive with Dynamic Brake (Westinghouse)

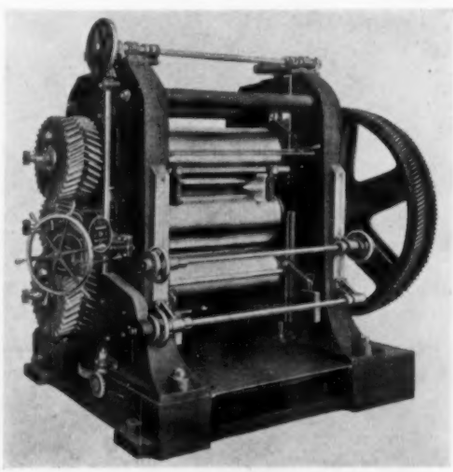
Medium Duty Mixer with 4 in. "Push-Pull" Propellors (Aslop Engineering Co.)



Five-Compartment Truck and Tray Dryer for Golf Balls (Drying Systems, Inc.)



Temperature Humidity Recorder (Amthor)



24 x 66" 3-Roll Calender (Vaughn)

and seriousness of accidents usually associated with the drives of heavy rubber machinery. The rather unique manner in which this braking is accomplished is worthy of mention. In effect, the braking is accomplished by converting into heat the energy bound up into rotation of the motor and the mill (s). Actually this is done by transferring the armature connection from the A. C. supply to a resistor, maintaining the D. C. excitation of the field winding. The motor thus acts as a generator, and the resistor as a load in which the energy of rotation is dissipated. To facilitate quick stopping the braking torque is increased by short circuiting the motor field rheostat during the braking period, which raises the field strength as the motor decellerates.*

The synchronous motor has also been adopted (without the dynamic braking feature) to other uses such as conveyor and worm drives and, as indicated above, for the synchronization of parallel or consecutive production stages. In conjunction with this and other types of motor drives, the enclosed speed reduction unit has resulted in a saving of space and a simplification of operating layout. While on the subject of drives and gearing it is well to observe the inroad that cut and herringbone gears have made in rubber machinery, as in other types, due to the resulting smooth operation.

Another motor application that has assumed interesting proportions is that for the mixing of solutions (simple or colloidal). In this regard the introduction of the "push-pull" principle—so-called, is worthy of note. Here the liquid at the top of the mixer or churn, in which the major axis is vertical, is forced down while that at the bottom is drawn up, resulting in rapid and thorough intermixing. This method is especially adaptable to cases where ordinary mixing is difficult due to high viscosity or to appreciable gravity differences.

To achieve uniform quality in rubber products, many types and styles of indicating, recording and testing equipment ranging from simple thermometers to complete operating panels have been adopted in the rubber industry. The introduction of latex has to a considerable extent done away with the use of solvents and the accompanying fire hazards, but where these inflammable liquids are used and their vapors are present, means for measuring and for maintaining and controlling humidity have come into use. Timing clocks operating bells, lights, and other signals for timing Banburys, mills, churns, grinders, presses and vulcanizers have been adopted where numerous duplicable mixes and cures are run. Indicators and recorders of temperature and pressure, flow-meters, and other similar instruments have become standard equipment for both operating and control purposes.

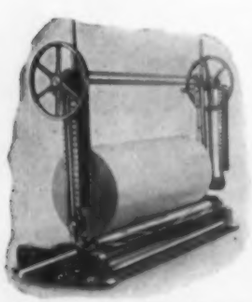
Where calendered stock is used or produced in quantity efficient equipment has been introduced to aid in inspecting, rolling and handling it. The gaging of such stocks is of course an important part of plant control and various hand and table types of gages have been devised, and adopted in practical operations. A somewhat advantageous and entirely logical procedure has been adopted in some of the larger plants where numerous gages are constantly in use. This is the checking and standardizing of all such gages to conform to a master gage in the same manner that hydraulic and steam gages are standardized. For some conditions where extreme accuracy of thickness gage is necessary there have been developed some very sensitive mechanical and electrical indicating devices. Two types are in use, namely the absolute reading and the differential types. The former indicates actual thickness, while the latter indicates the variation from a set or desired thickness and reads plus or minus on a dial bearing a zero center. Such devices, accurate to 1/10,000th of an inch, are of great value in running stocks such as thread stocks to be used for webbing purposes, and for golf ball tape and thread.

(To Be Concluded in Next Issue)

(*) A. S. Rufsvold. *Electrical World*, September 26, 1931.

Thickness Gage (Federal)

Operation Timer (J. H. Day Co.)



Rolling Up Machine (Cameron)

Inspection and Roll Winding Machine (Cameron)

Steam Flow Meter (Foxboro)

Upright Thickness Gage (Ames)

A Statement Concerning

RESEARCH on RUBBER

at Bureau of Standards

[Several researches on rubber at the Bureau of Standards have been stopped on account of the curtailment of funds in connection with the Government's economy program. This work can be resumed and carried on under the Research Associate plan. The nature and scope of some of this work and estimates of the cost of conducting it are given in the following paragraphs, furnished by L. J. Briggs, Director of the Bureau—EDITOR.]

Investigation of the Electrical Properties of Rubber

THE Bureau of Standards has, for some years, been following a definite program of research on the electrical properties of rubber. Stopping this work now would not only mean the loss of a considerable amount of research that is nearing completion, but it would also mean the giving up of an activity which is becoming increasingly valuable.

The aim of the research has been to provide basic data on the electrical properties of rubber. In accordance with this aim, measurements have been made of the dielectric constant, power factor, and conductivity in relation to the purity of the rubber, the per cent of sulphur employed for vulcanization, the frequency of the alternating current, and the temperature at which measurements were made. Five articles have already been published, and a sixth, now in press, contains measurements of the electrical properties of compounds of purified rubber and sulphur covering compositions in unbroken sequence from unvulcanized rubber to ebonite, frequencies from 60 to 300,000 cycles per second, and temperatures from —75° C., at which rubber is glass-hard, to 235° C., at which it decomposes rapidly on account of heat.

Of the work now in progress, the most important deals with the effect of hydrostatic pressure on the electrical properties of rubber. This is an extensive study covering several years and was undertaken to aid in determining the effect of ocean pressure on the performance of submarine cables. In addition to the above, some measurements are being made on the thermal, optical, and X-ray constants of rubber-sulphur compounds, as these may aid in understanding the electrical properties.

The natural extension of the work already accomplished is the study of the effect of fillers in rubber on the electrical properties. It is not proposed to make measurements on every known filler, but rather to study the underlying laws so that individual problems may be solved by the application of general principles. Relatively little is known concerning the dielectric constant of mixtures, and practically nothing concerning their power factor. This promises to be a fruitful field of investigation from theoretical and practical standpoints alike.

The practical value of this program of research has been demonstrated by some of the applications which have already been made of the results. The development of submarine cables has been stimulated, ignition wiring for aircraft has been improved, and some of the specifications for rubber-covered wire have been modified. It may reasonably be anticipated that with the growing complexity of the electrical industry basic data on rubber insulation will become increasingly valuable.

In order to continue the work as outlined above it will be necessary to have the services of a chemist and a physicist. The funds required for salaries, together with a reasonable allowance for equipment, supplies and overhead, amount to about $7,000 per annum.

Investigation of the Optical Properties of Rubber

The researches in progress at the Bureau of Standards on the optical properties of rubber are now being abandoned. Two projects on which significant progress has already been made relate to photoelastic methods of determining stresses in rubber and measurements of the refractive index of rubber.

The principles underlying photoelastic methods of stress-analysis in transparent materials are well known, but the present work is, so far as is known, the first in which these methods have been applied to a problem in connection with rubber. The present investigation is also the first in which a systematic study has been made of the double refraction of rubber in order to obtain basic data for this type of work. Photoelastic methods have been largely used as a means of studying stresses in structures so that the results of the present investigation will doubtless find application to the design of rubber parts for mechanical uses, but these results may also afford a hitherto unused tool for the study of vulcanization and other problems regarding the relation between chemical constitution and physical properties.

Measurement of the refractive index of rubber was undertaken because it affords data from which the dielectric constant at exceedingly high frequencies can be calculated. A preliminary survey of the field indicated that the results will not only serve this purpose, but will also be of value in the study of the mechanism of vulcanization. As this type of measurement is one that is readily made it may have important use as a general tool in the rubber laboratory and even for plant control purposes.

The above work could be carried forward in a modest way by one physicist making use of facilities now available. However, there would be some need for additional supplies and equipment. An allowance of $3,500 per annum should be sufficient for the present. *(Continued on next page)*

Investigation of Rubber by X-Ray Diffraction Methods

All interpretation of rubber behavior rests on a sound and detailed knowledge of the nature of the ultimate structural units of rubber (the molecular chains) and the way in which these units are organized to form the complex material, rubber. In this field the X-ray diffraction method is supreme. It provides a most powerful tool, a precise micrometer, for probing about within the rubber medium and unraveling many intricate details of structure which cannot be reached directly by any other physical research tool at our disposal.

Contributions to knowledge of far-reaching significance have already been made by this method, but on the whole, the results thus far obtained can reasonably be regarded only as a preliminary exploration of the field. The time is now ripe for carefully planned and extensive studies which will be sufficiently broad in scope to enable true and unambiguous interpretations of the data to be made. Specially designed X-ray equipment has been assembled at the Bureau of Standards with the above-indicated object in view. Some preliminary work has been done on the X-ray diffraction spectra of the system, pure rubber-sulphur.

This work has been stopped for lack of funds, but it can be resumed if funds are provided to secure the services of a physicist with broad training and experience. The estimated requirement for salary and incidental equipment and supplies is $5,000 per annum.

The Bureau of Standards is not authorized to administer funds from outside organizations for carrying on research projects. Several different methods have been evolved for administering such funds. A satisfactory one is the following:

An organization desiring to support a research at the Bureau of Standards should communicate with the Bureau indicating the project which they wish to support and the funds which they are willing to contribute toward this support. If the project comes within the scope of the Bureau's work, and if the funds appear to be adequate, approval of the project will be given and the Bureau will undertake to make arrangements with the National Research Council for administering the funds. When notified that arrangements have been completed, the organization will forward a check for the first installment, preferably for the first three months, the check being drawn to the order of the National Research Council but sent to the Bureau of Standards. The Bureau of Standards will then select suitable personnel for the research and will proceed with the investigation as soon as this personnel can be obtained. Quarterly reports will be sent to the organization, giving a financial statement and a report of the progress of the work. Whenever the research has reached such a point that a publication seems desirable, the Bureau will arrange to have the paper printed in a suitable journal.

Softened Rubber

A New Plastic Form of Rubber Which Is Said to Facilitate Processing Operations and to Effect Large Economies

AN INNOVATION in rubber processing, that of producing a plastic rubber, called "Softened Rubber," for which many novel claims are made, is attracting a great deal of attention at the moment in England, where a plant for producing this rubber has just been opened by Typke & King, Ltd., at Mitcham Common, Surrey, England. The rubber is a development of Messrs. P. Schidrowitz and R. M. Unger (Brit. Pat. No. 368,902), of which the following is a summary:

A soft rubber is produced by exposing crude rubber in dry condition and without mechanical working to an oxidizing atmosphere at a sufficiently elevated temperature, e.g., 330-347° F. and for a sufficient time to produce an increase of weight of at least .5 per cent and preferably of about 2 per cent. Preferably the rubber is first heated under non-oxidizing conditions, e.g., under reduced pressure, and then under oxidizing conditions which are continued while the rubber cools. The rubber is preferably in crumb or sheet form to present an extended surface to the oxidizing gases. In an example, rubber as received from the plantation is reduced to crumb, charged on to trays, and heated *in vacuo* to 340-345° F. for two hours; air is then admitted and the heating continued for about 45 minutes; the trays are then removed from the oven, piled in such a manner as to allow free circulation of air, and allowed to cool for about 45 minutes to about 120° F.; the crumb is then homogenized by masticating for 3 to 5 minutes.

The practical operation of the process, as described by the *India Rubber Journal*, issue of July 15, 1933, is as follows: It consists of a treatment by which the rubber is first of all reduced to crumb; this crumb is then taken and placed in trays in a huge vacuum heater—capable of treating 1,000 lb. in one charge—where it is given a heating in vacuum, lasting about one hour, followed by forty minutes in controlled conditions. When the doors of this oven are thrown open the crumb rubber is seen to have been converted to something (in appearance) very like toasted cheese. It next goes to the agglomerator—a pair of rolls which compact it again into sheet form.

The "crumber," consisting of a pair of rolls working in a hopper, takes the chunks of baked crepe from the soaking tanks in which they have been put to soften, and grinds or chews them into crumb. Below the rolls is a "saddle," onto which the rubber is forced—that is, the rubber goes down the nip and comes up on either side of the pair of rolls.

Softened rubber is ordinary plantation crepe or sheet which is converted into a form which is more plastic than ordinary masticated rubber, and which behaves normally during vulcanization and which yields products after vulcanization which, having regard to manufacturing conditions, are substantially of the same quality as those made with ordinary masticated rubber. As a result, the article continues, masticating, mixing, calendering and tubing operations are greatly facilitated, and far less power is required in the factory.

Claims made for softened rubber are as follows: It saves power, time, labor, solvents, overhead. It increases plant output and efficiency. Its use does not affect vulcanization, hardness, tensile, resistance to abrasion. It increases resistance to tear and absorption of water and air. It is also claimed that the possibility of scorching is greatly reduced.

MAKING TIRES at World's Fair

Firestone Demonstrates Every Step in Manufacture of Tires—Also Has Scientific Rubber Exhibit.

A MINIATURE tire factory is in operation at the World's Fair in Chicago—probably the first time in the history of the rubber industry that tires were completely manufactured under similar auspices. The manufacturer staging this demonstration is the Firestone Tire & Rubber Company, the only tire maker with an exhibit at the Exposition.

Housing the Firestone exhibit is one of the most elaborate buildings at the Fair—a modernistic structure surrounded by gardens, with a pool 100 feet long and 15 feet wide occupying the central location in front of the building. In this pool are installed six beautiful dome-shaped fountains of mist-like spray, with a jet of water in the center rising twenty feet above the surface. This unusual fountain is known as the "Firestone Singing Color Fountain"—the first one of its kind in the world. It is a marvel of beauty and scientific development, designed by well-known electrical engineers. Voice and instrumental concerts are given day and night by this fountain.

Submerged beneath each fountain dome is a battery of colored lights that reflect varied hues and shades upon the misty fountain domes, and these variations of color are synchronized perfectly with the shadings of the musical notes, and with the rise and fall of the water.

Overlooking the building and gardens is a sign eighty feet long, the first of its kind. Its shadow planes are placed one upon the other and the result is an ever changing multi-colored array of gorgeous shadow effects, melting into one another.

In the building itself, called the Firestone Factory and Exhibition Building, are the tire making demonstrations and displays of other Firestone products and activities including batteries, spark plugs, brake lining, rims, tractor, truck and bus tires, one stop service station, etc.

However, the point of greatest interest to visitors has proven to be the manufacture of tires. Here is a complete line of tire making machinery in operation from a large mill mixer right through to the wrapping machine—all in gleaming chromium specially finished for the Fair.

At the head of the production line is the mixing mill where actual milling and mixing is done. Then comes the gum dipping machine where the tire cords are dipped and

Harvey S. Firestone and Son Russell Take First Tire From Mold at the Exhibit

View Showing Production Line in the Manufacture of Tires—All the Equipment is Chromium Finished

coated with rubber; the calender to give the cords a layer of rubber; the bias cutter to cut the plys; the tire building machine, the expanding and forming machine where the airbag is inserted, the individual vulcanizing molds, the airbag extracting machine, the finishing and inspection operation and finally the wrapping and labeling machine. A complete tire—manufactured while the visitors wait—ready to be put into service.

In addition to the exhibits in its own building, Firestone has contributed a complete scientific rubber exhibit to the Hall of Science—one which shows graphically the gathering, coagulation and smoking of Para rubber; gathering and coagulation of latex on a plantation; vulcanization, electrodeposition; energy test of rubber and steel; resistance of rubber to abrasion, and other exhibits to show the many advances in rubber technology in recent years.

One of Firestone Exhibits in Hall of Science—Gathering and Preparing Rubber in the Jungle

Para-Dor, Aromatic Material

A LINE of aromatic materials, called Para-Dor, especially developed for use in rubber, was recently announced by Givaudan-Delawanna, Inc., New York City. A sample of a piece of rubber, compounded with Para-Dor No. 5145 has been sent out to the industry with the formula used in its manufacture. The stock contained 65.50% of smoked sheets and .08% of the odorant, the balance of the materials being blue base, stearic acid, whiting, zinc oxide, lithopone, accelerator, softener and sulphur. By the use of the aromatic material mentioned, it was possible to use smoked sheets in place of the more expensive crepe rubber, with only a slight rubber odor present. Even this odor could be overcome by the use of a larger proportion of the odorant, states the manufacturer.

New Mold Cleaning Method

A PATENT recently granted (U. S. 1,910,277) to Dr. F. K. Bezzenberger, Cosma Laboratories, Cleveland, Ohio, covers a new method of cleaning molds without the necessity of burning or brushing. The process is simply one of dipping the mold into a hot solution of chromic acid with or without catalysts such as sulphuric acid or potassium dichromate. Although chromic acid is used because it is low in cost and can be easily recovered, other materials, such as potassium dichromate, the various chlorates, perchlorates and peroxides may be substituted.

It is claimed that "the chemical reaction which takes place is essentially an oxidizing action with oxidation of the rubber parts of the film which bind or hold together the fillers or other material therein, and that the rubber is more or less completely oxidized into carbon dioxide and water, since little or no rubber residue remains after this treatment."

The patent also describes an electrolytic method to clean the molds by making the mold the anode in an electric circuit in which the solution forms the electrolyte, while separating the cathode and anode compartments is a porous diaphragm. Chromic acid with a small amount of sulphuric is used in the anode compartment while caustic soda is placed in the cathode compartment.

Diphase Rubber

THE result of long research into the diphase property of rubber was recently received by the Editor of THE RUBBER AGE in the form of a manuscript forwarded by the author, Mr. F. B. Menadue, Chief Chemist of the Barnet Glass Rubber Co., Footscray, Victoria, Australia. The treatise consists of approximately 15,000 words with 4 charts and 10 tables. In view of its length, it has not been deemed practical to publish the complete paper in these pages, except over a period of 5 or 6 months, which would lessen its value to any of our readers who are interested in this subject, and accordingly we would be pleased to loan the manuscript to any of our subscribers who might desire to examine it, provided it is returned promptly so that others may also make a study of its contents.

Hydrowax Emulsion

RUBBER products are now being coated with a special water wax emulsion called Hydrowax, according to Glyco Products Co., Inc., Brooklyn, N. Y. When this is applied properly the following advantages are said to accrue:

1. A glossy shiny surface results;
2. "Sun-cracking" is diminished;
3. Sticking of sheet goods is reduced;
4. Soiling because of handling and surface decomposition is curtailed;
5. The surface pores are sealed;

Its use is also indicated on leather, artificial leather, and cement or composition products of a porous nature.

Descriptions of New and Improved
Rubber Machinery and Equipment

New 5-Inch Dial Thermometer

A NEW 5-inch Dial-Indicating Thermometer in a black bakelite case has just been announced by C. J. Tagliabue Mfg. Co., Brooklyn, New York. This instrument was developed for equipment manufacturers who demand a moderately priced dial thermometer that stands up under severe operating conditions.

The new dial thermometer has an exceptionally powerful moving element or bellows suited to certain commonly used vapor tension ranges between minus 40 and plus 335° F.

New "Tag" 5-inch Dial Thermometer

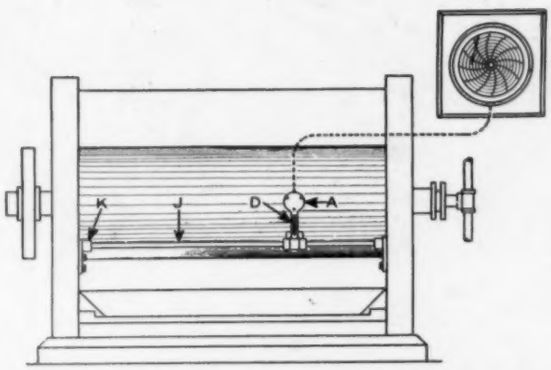
Neat in appearance, the black bakelite case serves as a contrast for the large white numerals of the black 5-inch dial. With the instrument case mounted at a convenient distance to face the operator, the pointer of the thermometer can be read as easily as the hands of a clock.

New Bulb for Surface Temperatures

A NEW sensitive bulb for surface temperatures of mill and calender rolls has been announced by C. J. Tagliabue Mfg. Co., Brooklyn, New York.

This new bulb is known as the "air gap" type. The sensitive bulb is built into a cavity of a bakelite bulb holder A, which is insulated to reduce heat losses to a minimum. By means of three sets of nuts on a set of bolts on the bulb holder, the bulb may be set with an "air gap" of approximately 1/64 of an inch. At this setting a temperature reading of only 5 or 10 degrees below the actual may be expected.

The bulb holder is adjustable up or down, by the shortening or lengthening supporting arm D by means of nuts in a slot of the arm. A counterweight tends to keep the bulb holder toward the roll and returns it to its original position if the bulb holder is temporarily thrust aside. A screw acts as a stop to prevent the bulb holder from making actual contact with the roll.



A typical installation of a "Tag" Recording Thermometer on plant mixing or warming mill rolls, showing the method of applying bulb to surface of roll. The bulb holder is located on a fixed cross bar between the end frames of the mill. A set screw permits fastening bulb holder at any part of the cross bar. A = Bulb holder; D = Supporting arm for bulb holder; J = Fixed shaft; K = Shaft supports on end frame of mill

The whole arrangement may be shifted as a unit along the fixed cross shaft to afford temperature indications along the entire length of the roll.

New Small Indicating Gauge

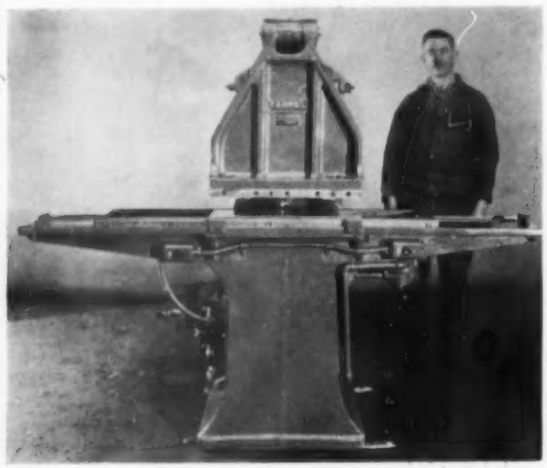
IN ANSWER to a demand for a small size, moderately priced, accurate indicating gauge with a full length 270° scale, the Foxboro Company of Foxboro, Mass., has developed a gauge (Model "DH"), so designed that it uses a full length Bourdon spring which results in a reduction in movement multiplication and an increase in inherent accuracy. This gauge is accurate to within 1 per cent of its total scale.

This model is furnished in a drawn brass case and ring with buffed nickel finish. The connection may be either top, bottom, left or right side. Dials may be had either with black background and white block figures, or white background and black figures. Any range from 0-15 lbs. per sq. in. to 0-300 lbs. per sq. in., as well as 0-30" mercury vacuum, can be furnished.

Pneumatic Gum Strip Press

ILLUSTRATED is a new type of pneumatically operated gum strip press designed for applying gum strips to fabric without the use of cement or other adhesive.

This machine is a two-platen press, giving a low unit pressure on the plates and using air as the operating medium. The use of air provides a quick operating cycle, as well as a follow-up squeeze; hence this unit combines certain of the advantages of both mechanical and hydraulic presses. It has been used successfully for applying gum



Farrel Pneumatic Gum Strip Press

reinforcement strips to fabric for boot tops, replacing the hand cementing operation.

The action of the air cylinder is applied to the moving crosshead or ram by a lever which multiplies the pressure, thus allowing the use of a much smaller air cylinder than would be required on a direct acting press, giving a more compact unit.

An air pressure of 70 lbs. per square inch, as available in the average plant, gives approximately 90 lbs. per square inch pressure on the platens, or a total plate load of 10 tons, based on 9" x 24" plates.

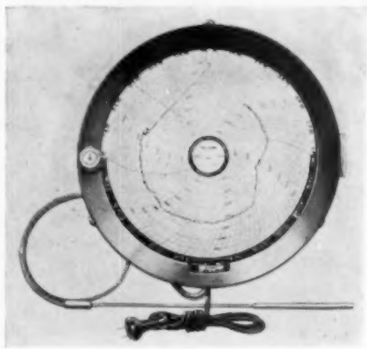
The operation of the press is controlled by a motor valve and an adjustable time relay so that by pushing two buttons the press closes and remains closed automatically under pressure any desired time from 5 to 40 seconds, and then opens automatically to complete the cycle. It will not close a second time until the control buttons are again pushed. Two buttons are used to start the cycle, one at either side of the front of the press, these buttons being wired in series so that the press operator is required to have both hands clear of the platens before the press can be started.

A hand controlled valve also is provided so that the press may be operated one step at a time, or for longer dwell periods than provided by the automatic control, if desired for special conditions. The platens are of steel, 9 x 24 inches, with a maximum space of 3 in. between platens. (Farrel-Birmingham, Inc., Ansonia, Conn.).

Recording Thermometer and Pressure Gauge

AN ENTIRELY new and improved line of 8" and 12" circular chart instruments has just been announced by the Brown Instrument Company, Philadelphia. These instruments include thermometers in indicating and recording types for temperatures from —40° F. up to 1,200° F., and indicating or recording pressure and vacuum gauges for ranges from 10" of water up to 5,000 lbs. All types are offered in one, two or three pen models.

In developing this new thermometer line, much research was devoted to improving the helix mechanisms (Bourdon tubes). The mercury-filled helix is built of a special stain-



Brown Recording Thermometer and Pressure Gauge

less steel which stands 100 per cent overload and provides a surplus of power to move the pen. The gas and vapor type helices are made of heat treated phosphor bronze which gives greatly increased ruggedness and power. These thermometers may be located at distances up to 200 feet.

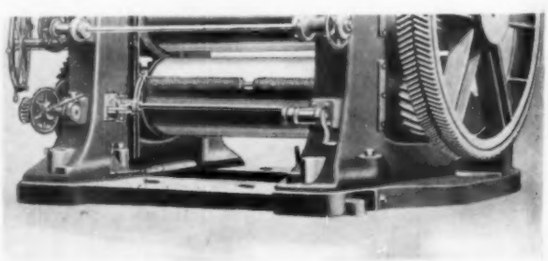
In the pressure and vacuum gauges, three different types of actuating movements are employed. For ranges 10 inches of water to 30 lbs., a flexible metal diaphragm is used. For ranges 30 and 200 lbs., a spring-opposed bellows has been developed which gives a powerful pen action in this range. For pressures over 200 lbs., a helix is used.

An electric clock eliminating hand winding daily, is standard for all models. Where A. C. current is not available, hand-wound clocks are furnished.

Cases are of die cast non-corrosive aluminum and are interchangeable for back or bottom connection or for flush panel mounting, permitting unlimited flexibility in installation.

Stretcher Brush

THE single type stretcher on brush shown against the lower roll of the calender illustrated here is applicable on all average work and is extensively used on calenders



Stretcher Brush Shown Against Lower Roll

for rubber, artificial leather and oil cloth fabrics, in cotton finishing on all form of dryers and printing machines or in any instance where loss in width, distortion or wrinkles occur. It spreads the fabric so that every cord or thread gets an even amount of rubber over the full width of the fabric, which means better material with no waste. Can be attached quickly and be made to fit any calender. Does not have to be threaded up. (The Bristle Stretcher Co., Mansfield, Mass.)

Editorial Comment

Tire Fabric Exemption

IT IS to be hoped that the temporary stay from the terms of the Textile Code, granted on July 30 to manufacturers of tire fabrics pending a final decision by President Roosevelt, will be of sufficient duration to enable tire manufacturers operating their own fabric mills to accumulate sufficient stocks to prevent a curtailment of tire production due to a fabric shortage.

If the President were to deny the pleas of the larger tire manufacturers to operate their fabric mills 24 hours a day for six days each week, it not only would work great hardship on those manufacturers, but outside mills would be forced to great expense and loss of time to equip themselves to make the particular kind of tire cord which each tire maker has developed over a period of years. Each of the larger plants uses cords of its own peculiar specifications and every mill is not equipped to make these cords.

In order, therefore, that tire makers may not be forced to cut their production, and that the larger tire plants may not be favored over the smaller ones, it is hoped that all mills making tire fabrics may be permitted to operate on the 144 hour week for as long a period as is necessary to tide tire manufacturers over the present rush of orders.

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Changing a People

THE thinking of people is not easily changed. President Roosevelt, however, seems to have accomplished, through his National Recovery plans, a change in the public temper such as economists have said could not be done. As Paul W. Litchfield says, the strange and startling theories which have been formulated and handed us in recent months have resulted in an almost revolutionary change in public thinking.

Maybe that's what this nation, and the world, has needed. Needless to say, conditions have taken a turn for the better. Employment is on the increase. Industries have signed the blanket code or formulated codes of their own. Everything points to a continuance of good business even if a slight let-up is expected in the next month or two.

We must, however, guard against too great an optimism or too great a fear. We must not expect a millennium nor can we look for a catastrophe. In the rubber industry, the tire code has been completed and other divisions are working on theirs. We must be thankful therefore that something concrete has come out of the many meetings of rubber manufacturers, but we must not expect the evils of years to be overcome overnight. It's too much to expect that the thinking processes of industries, or of people in general, can be entirely changed in such a short time but we can look forward to a general adoption of the principles evolved by the NRA, so that a better spirit of cooperation may imbue business men in the future.

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Research on Rubber

A REDUCTION is being made in the staff of the Bureau of Standards on account of curtailment of funds. By reason of dismissals and indefinite furloughs which became effective on July 16, it was necessary to abandon or seriously curtail much of the research that was being conducted on the basic electrical, thermodynamic, and optical properties of rubber.

According to Mr. Lyman J. Briggs, Director of the Bureau, this research is designed to add to the sum of knowledge of the fundamental properties of rubber and to determine accurately various important constants which have hitherto been determined only approximately or not at all.

This work was not planned with the view to any specific commercial applications. Many of the data sought have no apparent practical value; however, some of the results have already been of use to the industry and many other worth-while applications can be foreseen.

The value of fundamental research has been so fully demonstrated in other connections as to make it evident that investigations of this character may be of more general interest to the rubber industry than so-called practical studies of products and processes.

It is for this reason that the whole matter is being brought to the attention of associations, firms, and individuals in the rubber industry, in order that if any of them so desire they may have the opportunity to provide for the continuation of the research now in progress, at least until some of the investigations in the more advanced stages can be completed. A detailed discussion of the individual projects concerned is given in an article elsewhere in this issue. It is hoped that the industry will be able to supply the necessary funds to continue this valuable work.

CURRENT • NEWS of the Rubber Industry

AUGUST, 1933

Tire Industry Code Completed and Forwarded To Recovery Administration in Washington

After Many Weeks of Conferences by Executives of Tire Companies, First Code of Rubber Industry is Formed—Codes of Other Divisions to Follow

THE first division of the rubber industry to prepare a code for operation under the National Recovery Act was the tire division whose code was completed on July 28, after many weeks of conferences by repesentatives of all the tire companies in the country. A copy of the completed code (the text of which appears in full on the next page) was submitted to General Hugh S. Johnson, administrator of the National Recovery Act in Washington on July 29. At this writing no date has been set for the necessary public hearing but if no changes are suggested by the Code Analysis Division of the NRA, it is expected that a public hearing will be held within the next ten days.

The provisions of the code which attracted the most attention and discussion was Section 3, which empowered a committee of four members (or under certain circumstances, five members) to regulate the conduct of business by companies under the provisions of the code and to investigate and adjudicate all claims of unfair acts or practices or violations of the code.

The committee will consist of two members from Group A, understood to include only the four largest tire companies, Goodyear, Goodrich, Firestone and United States; one from Group B, including General, Seiberling, Kelly-Springfield and a few others in the same sales-volume class, and one from the balance of the industry, known as Group C. For each member of the committee, two alternates are to be elected, one of whom is to be selected to act if any practice of the company with which a regular member is connected is up for consideration. Newton D. Baker, special counsel to the Rubber Manufacturers Association, was designated as the fifth member of the committee, to act only if a deciding vote is necessary. Mr. Baker also was empowered to act as a sort of court of appeal to whom any party charged with an unfair act or practice might appeal a decision of the committee. If the committee ruling is concurred in by Mr. Baker then the party may ask that the matter be presented to the NRA administrator appointed to handle the tire code for a final decision.

Selling below cost is prohibited by the code—a provision which should go far towards restoring prosperity to the industry. No longer will it be possible to sell tires below cost to car manufacturers or to give huge discounts to large commercial accounts. For the purpose of the code, the cost of production is to be determined by the methods of cost determination advocated in the accounting manual of the Rubber Manufacturers Association.

Other terms of the code include acceptance of Section 7a, Title I of NIRA which (1) gives employees the right to bargain collectively; (2) no employee need join a company union or be prevented from joining a labor organization; (3) employers are to comply with hours of labor and rates of pay prescribed by the President. In regard to hours of labor, 36 hours a week is the maximum for factory employees except certain workers as engineers, maintenance crews, etc.; and 40 hours for office workers except outside salesmen. Wages for factory workers shall not be less than 40 cents an hour except in certain cases where a minimum of 30 cents was set; for office and sales employees the minimum wage ranged from $12.00 to $15.00 a week according to the population of the city or town where the worker is employed.

In order to participate in the tire code, a company must either join the Rubber Manufacturers Association or pay the association an amount equal to the company's pro rata share of the cost of creating and administering the code.

Hearings Are Fact-Finding

At the hearings in Washington any person whether having a labor, industrial or consumer interest may be heard. The hearings are not debates or trials and no argument is permitted. They are merely fact-finding devices so that the Administrator in charge may obtain a complete knowledge of all the facts in the case. At the conclusion of the hearings, the Administrator in charge receives reports from the Legal Division and the Research and Planning Division (members of which also attend the hearings), and then submits a report to General Hugh Johnson for review and for presentation to the President, who by his signature establishes the code provisions as the effective rules for the industry.

There have been reports of changes required in the code by NRA officials. It is known that a meeting of tire manufacturers was held in New York on August 10 and it is understood that the purpose of the meeting was to make revisions in the code. The discussion was said to center largely around the 36 and 40 hour week, unionization of plants and the appointment of Newton D. Baker as a member of the committee to adjust differences and to draw up a code of fair practices. This committee of four, it was revealed, consists of P. W. Litchfield (Goodyear), James D. Tew (Goodrich), George Stephens (Mansfield) and Charles Borland (Mohawk). Alternates for Stephens are F. A. Seiberling (Seiberling) and C. C. Gates (Gates); and alternates for Borland are Irwin Eisenbroch (McClaren) and J. A. Walsh (Armstrong). No alternates were selected at that meeting for Litchfield or Tew. It is understood that this committee has been instructed to complete its findings by August 22.

The Deputy Administrator who probably will be in charge of the Tire Code and the public hearings is Robert W. Lea.

It is understood that codes for other branches of the rubber manufacturing industry are being prepared and that committees of the association will have them ready shortly. Retail tire dealers are meeting in Chicago soon, under the auspices of the National Tire Dealers Association, to prepare a code for the merchandising of tires.

Tire Fabric Exempted From Textile Code

IN his first executive order, Hugh S. Johnson, the industrial administrator, on July 30 further extended the stay granted tire fabric manufacturers from provisions of the cotton textile code limiting the hours of machine operation.

The stay announced is of indefinite duration pending the President's decision on the contention of tire manufacturers that the code limitation of machine hours to two 40-hour shifts or a maximum of 80 hours a week would cripple their operation.

The exemption originally granted by President Roosevelt when he approved the cotton textile code on July 15 expired on July 30. The order will not only affect tire fabric mills operated by tire manufacturers but it also extends to all outside independent tire fabric mills.

EMPLOYMENT AND WAGES CONTINUE TO SHOW RISE

Continued peak factory operation coupled with the acceptance of the NRA blanket code by the rubber industry has resulted in increased employment and wages on the part of many rubber factories during the past month. Goodrich added over 1,500 workers in July with a total of 4,667 added since March. Lee is operating at capacity with an increase of 46% in employment and 15% in wages. Mansfield made a 10% wage rise in July. Seiberling, working at capacity, announced two 5% wage increases, one each in June and July. Ohio Rubber added 220 to its payroll on August 4.

The Firestone plant was employing about 12,000 workers at the end of July, all working under the terms of the blanket code. Cooper Corporation at Findlay added 100 to its workers in August, with a 20% wage increase. Pharis added 200 workers at the end of July and went on a six-day week with 6-hour shifts. On August 9 wage increases of 5 to 8% were made by General, Goodyear, Firestone and Goodrich.

Text of Tire Industry Code

(Submitted to National Industrial Recovery Administration, Washington, D. C., July 29, 1933)

The code is established for the purpose of effectuating the policy of title I of the NIRA.

ARTICLE I

The term "industry" as used herein is defined to mean the business of manufacturing for sale in the United States, solid rubber tires, casings or tubes for automobiles, trucks, tractors or trailers. The term "company" as used herein means and shall include persons, partnerships, associations and corporations promoting or actively engaged in the manufacture of the products of the industry. The term association as used herein means the Rubber Manufacturers association, a corporation organized under the laws of the state of Connecticut, and having its principal office at 250 W. 57th st., New York, New York. The term effective date as used herein means the 10th day after this code shall have been approved by the President of the United States.

ARTICLE II

Section 1. As required by Section 7 (a) Title I of the NIRA the following are the conditions of this code:

(1)—That employes shall have the right to organize and bargain collectively through representatives of their own choosing and shall be free from the interference, restraint or coercion of employers of labor or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection.

(2)—That no employe and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing or assisting a labor organization of his own choosing; and

(3)—That employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment, approved or prescribed by the President.

Section 2. On and after the effective date no company shall employ any person under 16 years of age.

Section 3. On and after the effective date (1) no company shall operate on a schedule of hours for its employes—except maintenance crews, engineers, firemen, electricians, tire testers, office, sales and supervising staff, shipping and watching crews—in excess of 36 hours per week with an annual allowed average of 104 hours to provide for peak production demands; (2) no company shall work accounting, clerical, office, service or sales employes (except outside salesmen) in any store, office, department, establishment or on any automotive or horse-drawn express, delivery or freight service, or in any other place or manner, in excess of 40 hours per week; and (3) no employe other than those herein specifically excepted from the operation of provision (1) of this section shall be employed by any company for more than 8 hours in any one day.

Section 4. On and after the effective date (1) no company shall pay any factory or mechanical worker or artisan—except learners during a six weeks' apprenticeship—less than 40 cents per hour unless the hourly rate for the same or similar class of work on July 15, 1929, was less than 40 cents per hour, in which latter case no company shall pay less than the hourly rate on July 15, 1929, and in no event less than 30 cents per hour; (2) no company shall pay any accounting, clerical, office, service or sales employes (excepting outside salesmen) less than $15 per week in any city of over 500,000 population or in the immediate trade area of such city, nor less than $14.50 per week in any city of between 250,000 and 500,000 population or in the immediate trade area of such city, nor less than $14 per week in any city between 2,500 and 250,000 population, or in the immediate trade area of such city; and in towns of less than 2,500 population to increase all wages by not less than 20 per cent provided that this shall not require wages in excess of $12 per week. Population for the purposes of this section to be determined by reference to the 1930 federal census.

ARTICLE III

Section 1. A committee constituted as in this article provided and herein referred to as "the committee" shall regulate the conduct of business by companies under the provisions of this code as hereinafter provided. The committee shall be empowered to investigate and adjudicate all claims charging unfair acts or practices in the industry or charging violations of this code.

Section 2. The committee shall consist of four members, or, under circumstances hereinafter set forth, of five members. Four of the members shall be chosen from the industry in the following manner:

Each company in the industry which shall become subject to the provisions of this code shall become a member of such one of three groups herein designated as Groups A, B and C, as the association shall determine.

The committee may from time to time, in the light of any substantial changes in the volume of sales of any company, make such changes in group membership as it may deem proper.

By vote of a majority of the group members, Group A shall elect two members to the committee and Groups B and C shall each select one member to the committee. Each group by like vote shall designate two alternates for each committee member elected by such group. No two of the persons so elected and designated shall be associated with the same company.

Section 3. In case any matter comes before the committee which specially involves acts, conducts or the interest of a company with which a committee member is associated, he shall not act on the committees in such matter; and the other members of the committee shall choose the alternate from the disqualified member's group to act in his place. In case the other members of the committee cannot agree upon the alternate to act in any such special matter, Mr. Newton D. Baker shall be asked to choose such alternate and his selection shall be final.

Section 4. If the committee shall by a majority or greater vote determine any matter adversely to a party charged with an unfair act or practice or with a violation of this code such party may appeal to Mr. Newton D. Baker and if Mr. Baker concurs in the determination of the committee, such determination shall be final but if Mr. Baker does not concur in such determination, then at the request of the party against which such adverse determination was made, the matter in dispute shall be submitted in writing to the administrator appointed under the NIRA with a summary of the arguments on each side, and Mr. Baker may, at the request of such party, represent him before the administrator. The administrator's decision on any matter submitted to him as herein provided shall be final.

Section 5. If in connection with any matter under consideration by the committee the committee shall be equally divided, Mr. Newton D. Baker shall be called in as a fifth member of the committee and the matter shall then be reconsidered by the committee of five members. If upon such reconstruction a majority of the committee shall agree upon a decision, such decision shall be final.

Section 6. If Mr. Newton D. Baker shall be unable temporarily to serve in any of the capacities set forth in this article, the committee shall request the administrator to appoint a substitute to serve in Mr. Baker's stead during the time he shall be unable to serve and a substitute appointed pursuant to such request shall during such time have all the powers and shall exercise all the authority given Mr. Baker hereby. If Mr. Baker shall decline to act further or shall become totally incapacitated the association shall appoint a person to serve in his stead in all such capacities.

Section 7. The committee may appoint such agents and representatives and employ such persons as it deems necessary and fix the compensation to be paid the same.

Section 8. The entire costs and expenses incident to the investigation and determination of any claim charging an unfair or practice or a violation of this code shall, if the final determination of such claim is adverse to the party complained of, be paid by the party complained of, but if the determination is not adverse to the party complained of, then such costs and expenses shall be paid by the party making such a claim.

ARTICLE IV

No company shall initiate a selling price for a product of the industry which will not return to the company initiating such a price at least its own individual costs of production and of distribution determined by the methods of cost determination advocated in the accounting manual of the association and revisions thereof adopted from time to time by the committee or by such other method as the committee shall determine to be applicable to a special situation not covered by the said manual or said revisions.

ARTICLE V

The president of the United States may from time to time cancel or modify an order, approval, license, rule or regulation issued under title 1 of the national industrial recovery act.

ARTICLE VI

Any company may participate in this code and in any revisions or additions thereto, either by becoming a member of the association or by paying the association an amount equal to the company's pro rata share of the cost of creating and administering this code.

ARTICLE VII

It is intended that such provisions of this code as are not required by the NIRA to be included herein may, with the approval of the President of the United States, be modified or eliminated as changed circumstances or experience may indicate, and that supplements to this code may be submitted from time to time.

NEW ENGLAND NEWS

Rudolph Neuberger, merchandise executive of The Zapon Co., Stamford, Conn., manufacturers of Zapon leather cloth, rubberized material and lacquers, and an affiliate of Richards & Co., is the author of an article—"Distribution—The Key to Profits," appearing in the August issue of "Connecticut Industry," a monthly magazine issued by the Connecticut Manufacturers' Association. The article, which asserted that distribution, and not mass production, is the real key to profits, and that it demands the same type of intensive scientific study that has been devoted to production, has attracted wide attention.

Marked improvement in orders is reported by B. F. Perkins & Sons, Inc., Holyoke, Mass., manufacturers of embossing rolls, gauges and other equipment. The plant's operation schedule has been stepped up to meet the demand. One customer recently placed an order for 100 spinning machines to be used for the manufacture of yarn for rubberized silk.

The Sponge Rubber Products Co., Derby and Shelton, Conn., held its annual outing for employes July 22 at Pleasure Beach, Bridgeport. Swimming and track events for both men and women featured the sports program. Frederick M. Daley, president, was the principal speaker at a luncheon which followed.

Wallace C. Hutton, secretary of the Seamless Rubber Co., New Haven, Conn., and president of the New Haven Chamber of Commerce, was the principal speaker at a meeting of the New Haven Lions Club August 2. Mr. Hutton discussed the activities of the Chamber.

Donald F. Carpenter, former general manager of the Pyralin products department, duPont Viscoloid Co., a subsidiary of E. I. duPont de Nemours & Co., has been appointed director of manufacturing in charge of manufacturing, research and development activities of the Remington Arms Co., Bridgeport, Conn. He will coordinate the operations of the Remington plants in Bridgeport and Ilion, N. Y.

STRIKES AT RUBBER FACTORIES SETTLED

Four strikes of workers in rubber factories during July and August have been settled and work resumed after layoffs of part of a day to over a week. In Akron a walkout of pit workers occurred at the Mohawk Rubber Company plant on July 12 but after a new wage rate had been established work was resumed. A wage dispute at the Falls Rubber Company plant resulted in a half-day halt on August 3. Settlement was to be taken before NRA arbitrators.

In Hartville, Ohio, 150 workers at the Monarch Rubber Company refused to go to work on July 14, in protest on the base wage rate. After State Labor Department conciliators from Cleveland had worked with the factory officials and a strikers' committee, the strike was settled on July 20, with a new wage scale in effect and recognition given to a rubber workers' union.

In the East, at Chicopee Falls, Mass., a strike of 300 tire builders at the Fisk Rubber plant on July 26 resulted in a complete shut-down of the factory. On July 30, operation was resumed after a 30% increase in piece work rates had been granted.

Names in the News

R. O. Bishop, formerly chief chemist of the Agricultural Department of the Federated Malay States and Straits Settlements, and now chief chemist of the Rubber Research Institute of Malaya, arrived in this country recently for a month's visit among users of plantation rubber and latex. While here Mr. Bishop will acquaint himself with the desires of consumers in regard to possible improvements in rubber and latex. He will also make a study of the various processes relating particularly to the actual and potential uses of latex.

The National Association of Credit Men at the organization's thirty-fifth annual convention in Milwaukee elected Ernest I. Kilcup, Secretary and Acting Treasurer of the Davol Rubber Company, Providence, R. I., its president.

The association is one of the largest with a membership of more than 20,000. Mr. Kilcup is one of the youngest men who has ever headed the organization. For many

E. I. KILCUP

years he has been a member of important national committees of his association, and was a director from 1923 to 1931. Mr. Kilcup was one of the association's three vice-presidents elected at the 1932 convention.

Mr. Kilcup was born in Providence and has been with Davol since 1918. He was a member of the faculty of Northeastern University where he lectured in economics, merchandising, marketing and financial management. In addition to his financial work, he has originated technical changes in Davol products. During the year he is expected to cross the continent to visit local groups of the association.

Dr. Giuseppe Cozzo, representative of the National Fascist Association of Mechanical Industries of Milan, Italy, was a visitor at the B. F. Goodrich Company factories, Friday, July 7. Dr. Cozzo has been making a tour of the United States to study the technical, industrial and commercial organizations as well as the trade and industry organizations of this country, and was in Akron to gather data on the rubber industry.

Dr. H. L. Gough, superintendent of the engineering department of the English National Physical Laboratory at Teddington, England, was a guest of the B. F. Goodrich Company, Saturday, July 8th. Dr. Gough, a member of the American Society for Testing Materials, of the Institute of Metals, and a fellow of the Physical Society and Royal Society, is one of the distinguished scientists of the world brought to America by the Century of Progress as one of its lecturers.

Wilmer Tate, secretary of the Central Labor Union in Akron, was selected by the American Federation of Labor to represent labor at Washington in the coming discussions there over formulation of a code for the rubber industry.

A. M. Eggleston has been elected treasurer of Kelly-Springfield Tire Co. The post of treasurer was formerly filled by W. H. Lalley, president of the company, in addition to his duties as president.

C. E. Hyke, factory manager of Ohio Rubber Company, Willoughby, Ohio, has resigned and H. M. Koelecker has succeeded him. No reason was given for the resignation. Mr. Hyke has been connected with Ohio Rubber since 1924 with the exception of a two year period between 1930 and 1932.

Dr. R. V. Yohe, research chemist at Goodrich, a recent benedict, returned from his honeymoon early in July, after spending several weeks with Mrs. Yohe traveling through New England.

A. F. Schoen

August F. Schoen, 54, president and general manager and one of the founders of the National Sherardizing & Machine Co., Hartford, Conn., manufacturers of mandrels, polishing equipment for the rubber industry, etc., died suddenly August 2 at his home in Hartford.

Born in Germany, Mr. Schoen came to America at the age of five. He worked on his father's farm in Falls Village, Conn., until he was 19, when he became employed by The Stanley Works, New Britain. In 1909 he left to become one of the founders of the New Haven Sherardizing Co., New Haven.

Associated with Mr. Schoen in the venture were Judson H. Root, J. McA. Kay Johnson, Shiras Morris and John F. Forward. The company was incorporated as the National Sherardizing & Machine Co. in 1919 and moved to Hartford.

The company did much work in developing the sherardizing process, a method of rustproofing iron and steel commonly known as zinc alloy, invented by Sherrod Cooper Cowles of London, England. After the process came into general use for finishing mandrels used in the rubber industry, the National company opened a branch plant at Akron, O., in 1923, which is still in operation.

W. J. Harpham

William J. Harpham, 22, son of Fred J. Harpham, vice-president of the Goodyear Zeppelin Corp., Akron, O., died at Hartford, Conn., July 17, of peritonitis after an operation for appendicitis. He had been visiting a friend in Farmington, a Hartford suburb, when stricken.

Bergougnan Signs Contract to Make Tires in France by Seiberling Methods

ANNOUNCEMENT was made on July 22 by F. A. Seiberling, President of the Seiberling Rubber Company, that a contract had been made between his company and the Societe Generale Des Etablissements Bergougnan, Clermont Ferrand, France, whereby Seiberling methods of tire production will be adopted by the French firm in building pneumatic tires in that country.

M. Raymond C. Bergougnan, head of the French Company, the products of which bear his name, is well known to the rubber industry both here and abroad. Bergougnan tires and other rubber products are widely distributed throughout the world. At one time the company had a factory at Trenton, but production in this country was discontinued in 1917. Bergougnan is chiefly known as a builder of solid tires.

Three members of the Bergougnan Company are now at the Seiberling plant in Akron—Auguste Faure, head of factory engineering and operation and a director of the company; Albert Beke, chief chemist; and Louis Levadoux, in charge of tire building operations. They will be at the Seiberling factory for two months, studying Seiberling factory operating methods. They will also purchase new machinery for installation in the Clermont Ferrand plant.

"In recent years," stated Auguste Faure, head of the French group, "we have recognized American leadership in the building of pneumatic tires. Our decision to adopt Seiberling methods of tire construction resulted from exhaustive tests made in France. We also studied the production methods of the Avon India Rubber Co., Ltd., at Melksham, Wilts, England, who have been using Seiberling production methods in their factory for the past two years. Our decision to form a liaison with Seiberling was influenced by the success of Seiberling tire building methods as used by the Avon India Rubber Company, Ltd., of England, and by satisfactory product tests of tires made by this company and of tires built by Seiberling in the United States. Our plant will be completely remodeled under the supervision of Seiberling engineers. We expect shortly to be producing pneumatic tires, incorporating Seiberling methods of construction in our French plant.

"W. S. Wolfe, Vice-President in charge of production at the Seiberling Rubber Company, came to France at our request to discuss our problems. Our decision to seek an alliance with the Seiberling Rubber Company was also influenced by Mr. Karl Kilborn, who visited our plant several times, coming from the Avon India Rubber Company where he was representing the Seiberling Rubber Company in the capacity of consultant engineer."

K. B. Kilborn, who is chief engineer of the Seiberling Rubber Company, recently returned to the United States from England and will go to France about September 1st to take charge of the installation of new machinery in the Bergougnan plant. He will remain there as consultant engineer for approximately six months. The agreement between Bergougnan and Seiberling covers a ten-year period.

Bergougnan Officials at Seiberling Plant

Left to Right: August Foure, F. A. Seiberling, W. S. Wolfe (standing), Louis Levadoux, Albert Beke

Norwalk Tire Dividend

The regular quarterly dividend of 87½ cents on the preferred stock of Norwalk Tire & Rubber Company was declared last month, payable October 1 to holders of record on September 22.

Rubber Industry Makes Immediate Acceptance of NRA Blanket Code

FOLLOWING almost immediately after President Roosevelt's appeal over the radio on July 24, the rubber industry took steps to join in acceptance of the NRA Blanket Code. Company after company wired the President of their adherence to the terms of the code and within a few days the industry was practically 100% behind the NRA.

On July 25, F. B. Davis, Jr., President of the Rubber Manufacturers Association, announced that he had wired all rubber manufacturers in the country, both members and non-members of the Association, urging them immediately to wire President Roosevelt of their acceptance of his Reemployment Agreement, or Blanket Code, so that the President might have immediate knowledge that the rubber industry was in complete accord with the purposes of his program.

President Davis indicated this action was taken despite the impending completion and submittal to the National Recovery Administration of a general code for the whole rubber manufacturing industry, and supplementary codes covering operations of major commodity groups within the industry.

As president of U. S. Rubber Co., Mr. Davis on the same day wired President Roosevelt as follows:

"The industrial groups of which our company is a part are actively at work on the preparation of codes for presentation to the National Recovery Administration or are already operating under approved codes. Meanwhile I accept your Reemployment Agreement on behalf of the United States Rubber Company and our associated companies so that you may know that we are in complete accord with the purposes of your program . . ."

In Akron, Goodrich, Goodyear, Firestone, General, Seiberling and others of the smaller companies also wired their acceptance of the code and took immediate steps to adhere to the terms of the code whenever their wage or employment policies required such action. Other Ohio companies, including Pharis, Cooper, Swan, Faultless, Dayton, Ohio Rubber, R. C. A. and Eclat, also accepted the Blanket Code and wired Washington to that effect. Others to announce publicly their acceptance were Norwalk, Lee, Corduroy and Mansfield.

The immediate effect of this action by the rubber industry was to raise wages, decrease hours of employment and increase the number of workers. This was only done, however, in those factories where hours and wages did not already conform to the minimum set in the code.

Who Imports "African Flakes"

One of our readers abroad is interested in locating firms in this country who use "African Flakes" or "Pinky Paste" grades of rubber used largely by manufacturers of "fly catchers." The name of the concern making inquiry is Gust. Hansing & Bazoche, Gr. Reichenstr. 79, Hamburg 8, Germany.

RUBBER CONSUMPTION MAKES HIGH RECORD

Consumption of crude rubber by manufacturers in the United States for the month of June amounted to 51,326 long tons, which is the highest consumption figure on record. This compares with 44,580 long tons for May this year, and represents an increase of 15.1% over May and 23.8% over June a year ago, according to statistics released by the Rubber Manufacturers Association. Consumption for June, 1932, was reported to be 41,475 long tons. Consumption for first six months of 1933 amounted to 184,724 long tons, as compared with 190,924 long tons for same period 1932.

Imports of crude rubber for June were 22,729 long tons, a decrease of 17.5% under May and 45.1% below June, 1932.

The Association estimates total domestic stocks of crude rubber on hand June 30 at 333,954 long tons, which compares with May 31 stocks of 364,623 long tons. June stocks show a decrease of 8.4% as compared with May of this year, and were slightly lower than June 30, 1932.

The participants in the statistical compilation report 63,608 long tons of crude rubber afloat for the United States ports on June 30 compared with 43,342 long tons afloat on May 31 this year, and 43,079 long tons afloat on June 30, 1932.

June reclaimed rubber consumption is estimated to be 9,674 long tons, production 10,591 long tons, stocks on hand June 30, 13,231 long tons.

Tire Production Increases

Shipments of pneumatic casings for the month of May amounted to 5,180,173 casings, an increase of 41.8% over April and 21.7% above May, 1932, according to statistics released by the Rubber Manufacturers Association, Inc. Production of pneumatic casings for May were 5,189,291 casings, an increase of 66.1% over May and 35.8% above May, 1932.

Pneumatic casings in the hands of manufacturers May 31 amounted to 6,760,165 units, practically no change as compared with April 30 stocks, but was 27.9% below stocks May 30, 1932.

Rubber Division Merged

The Rubber Division, Department of Commerce, has been amalgamated into a new Leather-Rubber-Shoe Division. E. G. Holt, formerly chief of the Rubber Division, is now Assistant Chief of the new division.

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Financial News

LOSS OF $3,419,304 SHOWN BY U. S. RUBBER

Net sales of United States Rubber Company, for the six months ended June 30, 1933, amounted to $36,494,680. Sales for the first six months of 1932 were $42,432,014. Net sales of the Samson Tire and Rubber Corporation and of the Gillette Rubber Company, which have not been included with the sales of the United States Rubber Company, amounted to $4,489,787 for the first six months of 1933 compared with $6,202,020 for the same period of 1932.

The loss from operations, after interest on funded indebtedness of $2,027,073 but before provision for depreciation, amounted to $224,204. Provision for depreciation was $3,195,100 and the net decrease in Surplus Account amounted to $3,419,304. Current assets were $42,941,372 and liabilities $8,562,985. The plantations had a loss of approximately $156,000 after all charges, including provision for depreciation amounting to $168,000. These results have not been included in the statement of the United States Rubber Company.

Goodyear Reports Loss

Goodyear Tire & Rubber Co. and subsidiaries report, for six months ended June 30, loss of $738,036, after interest, depreciation, etc., but before adjustment for foreign exchange reserves previously set up. This compares with net profit of $50,509, or 6 cents a share on 762,023 shares of $7 preferred stock, in first half of 1932, after mark-down to market prices of raw materials and raw material content of finished goods.

After adjustment of $1,298,987 for foreign exchange reserves previously set up, company carried $560,951 to surplus.

Goodrich Reports Profit

The B. F. Goodrich Company and its subsidiaries for the six months ended June 30, 1933, report a net profit of $870,577 after full provision for depreciation, interest and Federal Income Tax.

The operating profit for the period, after deducting approximately $650,000 of nonrecurring charges, amounted to $311,659. To this was added a profit of $2,303,798 arising from purchases of the company's bonds and debentures and $746,126 represnting appreciation in foreign exchange rates, giving a total of $3,361,583. From this was deducted $2,491,006 covering interest, miscellaneous corporate charges and provisions for Federal Income Tax.

India Reports Progress

India Tire & Rubber Company reported sales of $211,925 in June with a profit of $1,669 after setting aside a reserve of $17,670 for doubtful accounts.

Ohio Rubber Shows Loss

A loss of $182,741 was reported by Ohio Rubber Co., Willoughby, Ohio, for the year ending May 31. No dividends have been paid on the common stock since 1930 and since July 1, 1932, on the preferred stock. Franklin G. Smith has succeeded Henry Hallock as president.

Firestone Dividends

A dividend of 10 cents a share on 2,250,000 shares of common stock was paid last month by Firestone Tire & Rubber Company. On July 28 the regular dividend of $1.50 a share was declared on the company's preferred stock, payable Sept. 1 to holders of record on August 15.

RUBBER UNIONS MAKING PROGRESS IN AKRON

The movement to unionize rubber workers in Ohio is progressing rapidly, aided by the NRA codes. Already one rubber plant, that of the India Tire & Rubber Company, has become 100% unionized and meetings of workers in other plants are taking place daily. The announcement of India was made on July 29 as the result of a meeting of employes held on the previous night. The organization meeting was held under the auspices of the American Federation of Labor and was directed by William Tate, executive secretary of the Central Labor Union which embraces the Rubber Workers Union. Complete consent of the executives of India Tire was obtained by the employes before the meeting was held.

In the meantime, workers in other rubber plants are organizing under the direction of local unions. Workers at the plant of Ohio Rubber Co., at Willoughby met on July 24 to organize a union; unions were started at Goodrich and at Falls Rubber on August 6; workers at Mohawk met August 4 to organize; Seiberling-Latex Products employes met on July 26. Charter applications were also filed for Goodyear, Firestone, General and R. C. A. Rubber. In the East a rubber workers union was organized on July 30 at the plant of Fisk Rubber Company.

GOODYEAR ANNOUNCES $500,000 EXPANSION

Plans were announced by Goodyear Tire & Rubber Company on July 20 for a new power plant building with equipment costing $500,000. The improvement includes a new power plant building and six new boilers, including one large boiler capable of generating 300,000 pounds of steam per hour at a pressure of 800 pounds per square inch.

The whole project, involving water-softening equipment, control devices for the power plant, an elaborate synchronization device to mix water, fuel and air, and electrified units, will be completed by November. A portion of the present power plant will be torn down and a new brick and steel structure will be erected. The old building and the boilers it houses have seen 23 years of service. The new building itself will cost approximately $20,000.

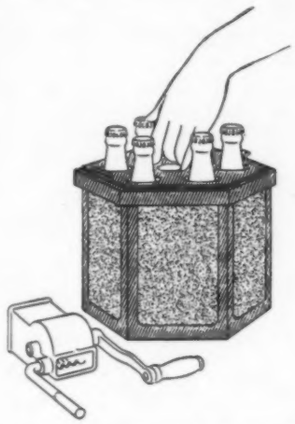
Clay Association Meets

The New Jersey division of the American Clay Association held a luncheon meeting, August 2nd, at the Woodrow Wilson Hotel, New Brunswick. Frank M. Crossman, Clyde W. Hall and Hampton Cutter were appointed to attend a meeting in Washington shortly to confer with representatives of the Kentucky-Tennessee group.

New Rubber Goods

Rubber Beverage Cooler

Molded hard rubber is used as the container and lid of a new cooling device called Lightning Beverage Cooler recently announced by John H. Graham & Co., selling agents, 113 Chambers St., New York City. The container holds six bottles and has an ice cube breaker attachment which chips ice



to fill the space surrounding the bottles. By removing the ice cube breaker, the bottle cooler may be carried by a convenient handle in the hard rubber lid.

Goodyear Step Plate

A new, heavy-ribbed, rubber step plate to be used on new cars as mud plates or to repair worn running board mats has been announced by Goodyear Tire & Rubber Co. They can be tacked to wood running boards or may be cemented with steptread cement to either wood or metal boards. The plates are black, and measure 7¼ x 10⅞ inches.

Firestone Sealtyte Tube

A new inner tube that eliminates air leakage has been announced by the Firestone Tire & Rubber Company. It is called the Sealtyte-Leakproof tube, the name referring to two construction features. They are a tapered rubber valve stem that is cured into and becomes an integral part of the tube and a special compounded coating on the inside of the tube that seals the pores of the rubber.

Ordinary tubes with a metal valve stem which lose up to five pounds air pressure per week are constantly becoming underinflated. This causes premature tread wear, stone bruises, scuffing, internal friction heat, blowouts, decreased operating efficiency, and increased danger.

In the new Sealtyte-Leakproof tube the tapered rubber valve-stem prevents air from escaping around the valve base. It also prevents dirt and water from entering the rim valve opening to affect the tube or rust the rim. The new stem and the coating inside the tube thus remove the causes of under-inflation.

Seamless Rubber Bathing Suits

The latest entry in the rubber bathing suit field is the Seamless Rubber Co., New Haven, Conn., which has brought out a line of "Pebble-Crepe" suits. "Pebble-Crepe" is a fabric-like rubber similar to that used on the newer bathing caps. The suits are well tailored and form fitting. They are made

New Seamless Rubber Bathing Suit

in the two piece style with side snap shorts and six panel bandanna type top, with no shoulder straps or back. They are available in various combinations of blue, green, yellow and white.

Elastic Waist for Trousers

An entirely new idea in sports trouser waists, of which there have been several this year, has just been marketed in Britain by Avison, Hare & Co., Ltd., Leeds. The idea incorporates a prong-buckled half-belt in the front and a device in elastic webbing which gives a smart hang to pleats.

The outstanding feature of this new waist suspension is the ease and rapidity with which it can be adjusted. Trousers fitted with the new rubber device are being marketed under the name "Nubelt." They do not require support either from a detachable belt or suspenders.

Litchfield Sees Better Times

IN a copyrighted article appearing in the *Journal of Commerce* on August 4, Paul W. Litchfield, President of Goodyear Tire & Rubber Company, expressed the hope that the present wave of buying would continue and that we have definitely turned the corner. His article in part states:

"Business is distinctly and greatly better. How much of the improvement may be due to new national policies and how much might be traced to the working out of normal economic forces, is a question.

"I don't know that the answer matters so much since the fact remains that we are attaining a firmer footing. Relief has come to many distressed families as the ranks of the army of unemployed have diminished. I believe there will be continued improvement and with it a further extension of these distress-relieving forces.

"I do not want to present myself as an unbounded optimist; I recognize that there is still much unemployment and that purchasing power remains abnormally low. But I do find grounds for extreme gratification in the fact that we have definitely turned the corner, that the nation is responding to a leadership whose objective is to improve the lot of mankind.

"This response is best expressed in the current wave of buying which has brought about such a marked improvement in our tire business."

10% INCREASE IN TIRE PRICES ANNOUNCED

The third increase in tire prices within three months was put into effect by all tire manufacturers on July 26 when a 10% rise went into effect. The first announcement was attributed to U. S. Tire Company, but all the leading companies made similar announcements almost immediately. In its statement, Goodyear said that tire prices are still below the level of last September. Tire prices have been abnormally low due to higher cost of rubber and cotton and because of increased expenses attendant upon shortening hours in both the cotton and rubber industry. In some quarters another increase is looked for in September.

Goodyear Men Get Vacation

A vacation of one week for all hourly and piecework employes with five years' service or over on November 1, 1933, was approved by Factory Manager Slusser of Goodyear Tire & Rubber Co., on July 8. The vacation pay for employes with five years' service will be one per cent of their 1932 earnings, and the vacation pay for employes with 10 years' service will be two per cent of their 1932 earnings. The vacation period starts August 1.

Booklet on Spheron Issued

A twenty-two page booklet telling about the development of Spheron, the dustless carbon black produced by Godfrey L. Cabot, Inc., Boston, Mass., has just been issued. The booklet goes briefly into the history of the manufacture and use in the rubber industry of carbon black, the development of compressed black around 1919 and the experimental work on a dustless black started in 1924, resulting in commercial production in 1932.

A. S. A. TAKES OVER SOME GOVERNMENT ACTIVITIES

According to announcements made last month, certain functions of the National Bureau of Standards, Washington, D. C., are being taken over by the American Standards Association, New York City, as a result of the discontinuance by the Bureau of most of the work it has been carrying on in the field of simplification, commercial standard, safety codes and building codes. This curtailment has been made necessary by the economy program of the government.

The activities of the Bureau taken over by the A. S. A. are the following: Division of Trade Standards; Division of Specifications; Division of Simplified Practice; Building Code and Plumbing Code Sections of the Building and Housing Division; Safety Code Section.

That the A. S. A. can capably carry on this work is indicated by the fact that since 1918 when it was organized by five major engineering societies to serve as a clearing house through which the standardization work of technical and industrial bodies would be correlated and to prevent the duplication of work and the promulgation of conflicting standards, the Association has approved 237 national industrial standards, and projects for 135 other standards are under way. Nearly 3,000 technical experts representing more than 500 trade associations, engineering and scientific societies, government agencies, and other bodies are included in more than 400 standardization committees operating under American Standard Association auspices.

Among some of the standards and codes developed by the association of particular interest to rubber manufacturers are those on mills and calenders, insulated wire and cables, rubber machinery, etc.

OVERMAN DECISION IN GOODYEAR SUIT UPHELD

The decision awarded Overman Cushion Tire Co. on February 24 by the Southern District Court of N. Y., in the suit against Goodyear Tire & Rubber Company for infringement of Overman patent on cushion tires (U. S. No. 1,092,078) was upheld on July 17 by the U. S. Circuit Court of Appeals for the Second Circuit (N. Y.) after a hearing on the lower court's decision. This ruling follows closely on a similar decision rendered by the Cincinnati Court of Appeals early in June.

The latest decision in New York upholds the lower court's verdict that the patent was valid and had been infringed and the master's report of damages in the amount of $1,098,820 with interest from May 2, 1930.

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REVIEW SHELF

• Monthly Review of New Books, Pamphlets, Company Catalogs, Service Bulletins, House Organs, etc., Pertinent to the Industry.

TUNCHI by Carl Liddle and David Thibault. 312 pp. Published by the Century Company, New York City. Price $2.00.

This is a novel of unusual interest, with the jungle country of Ecuador as background for a tale of love and adventure among warring Indians, treacherous Spanish mixed breeds, and desperate runaway white men. The hero enters the jungle in search of an absconding chemist, and is soon drawn into a series of adventures including tribal feuds, wars, slave trading, experiences in Indian witchcraft, observation of the process of head-shrinking which produces the "tsantsa" or dried head, and a romantic love affair with a head-hunter princess, Tunchi.

Especially striking is the accurate picture of the civilization of the Jivaran Indians presented by Mr. Liddle, who speaks from first-hand knowledge, having spent several years among the people and scenes reproduced in his book. He has endeavored to convince the average reader that the so-called dangers of travel in the jungle, where rubber is not unknown, tend to be exaggerated, although he does admit that they do exist.

The concluding chapters tell how and to what extent the American hero succeeds in his original quest and in his later plan to take out to civilization the princess, Tunchi. The total result is a story of unusual quality, especially in its execution.

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THE NEW DEAL IN BUSINESS, by William O'Neil, president of General Tire & Rubber Company, Akron, Ohio. Pamphlet; paper cover. Published by General Tire & Rubber Company. For free distribution.

This pamphlet contains the recent coast-to-coast radio talk from the Chicago NBC studios given by William O'Neil, in which he discusses the present day problems of independent merchants, particularly tire dealers.

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THE FLEXOMETER, AN INSTRUMENT FOR EVALUATING THE FLEXURAL PROPERTIES OF CLOTH AND SIMILAR MATERIALS. Research Paper No. 555. Reprint from Bureau of Standards Journal of Research. Vol. 10, May, 1933. Paper cover pamphlet; 10 pp. For sale by the Superintendent of Documents, Washington, D. C. Price 5 cents.

An instrument called the flexometer with which the flexural work, flexural resilience, and flexular hysteresis of fabrics, paper, sheet rubber, and similar materials can be evaluated is described. Typical results in the form of curves showing the flexular characteristics of cotton and silk fabrics, paper and sheet rubber are given. The angle to which specimens must be folded to obtain comparable results depends upon the thickness of the specimens. An equation for determining the minimum angle for any given thickness of specimen has been developed.

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THE EFFECT OF ACICULAR ZINC OXIDE ON THE PHYSICAL PROPERTIES OF A RUBBER COMPOUND. By M. K. Easley, American Zinc Sales Co., Columbus, Ohio. Paper cover booklet. 8 pp. Reprint of paper from *The Rubber Age*, N. Y., June, 1933.

This reprint offers a comprehensive analysis of the topic suggested by its title. It shows that where resistance to tear is of no great importance, rubber stocks compounded with acicular zinc oxide offer certain advantages which are not obtained with the more commonly used non-acicular type of zinc oxide. Acicular zinc oxide produces greater stiffness with no appreciable change in hardness or abrasion irrespective of the choice of accelerators.

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THE VANDERBILT NEWS, July-August, 1933. Published by the R. T. Vanderbilt Company, New York City. 42 pp. and cover. For free distribution.

This issue deals exclusively with Captax, discussing its history, properties, uses and advantages, and with the aid of charts, shows the results of tests made with Captax and various materials. Included are also formulas for tire carcass, inner tubes, belt friction, wire insulation, garden hose, heels, transparent rubber, double texture fabric, bathing caps, bands and thread, black footwear, suede, white sidewall, blown ball (white), refrigerator gasket, cable cover, fan belt, and clothing stock, in all of which Captax is included.

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FACTORY REORGANISATION, by Thos. W. Fazakerley. Published by Messrs. Gee & Co., Ltd., London, England. Cloth cover. 5½ x 9½ in. 96 pp. including indez. Price 6s. 6d. in U. S.

This book deals in a clear manner with such important factors in factory reorganization as Labor Analysis, Material Storage, Methods of Wage Payment, Purchasing, Overhead Expense Analysis and Distribution, Production Statistics, Maintenance Costs, Order Systems, Supervision and Administration. These various factors are accompanied by many sample forms and the whole work is thoroughly cross-indexed for easy reference.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, AUGUST 10, 1933

Crude Rubber

THE market for crude rubber is not far off from the price of a month ago when it was quoted at 7½c on July 11 compared to 7⅝ today. However, it did reach 9⅞ on the outside market on July 17 when spot was quoted at a high of 10.15 on the Exchange. The highest price reached for futures during the past month was 11.94c on July 17 for June position. The average price in the outside market for the month was 8.01 compared to 6.15 for June. The drop since July 17 has been largely speculative and based on the possibilities of definite word on restriction, which is now temporarily discounted in the trade. Quotations on the outside market and on the New York Exchange and the London and Singapore markets, as of August 10 follow:

Plantations—

Ribbed Smoked Sheets—			
Spot	—	@	.07⅝
August	—	@	.07⅝
Oct.-Dec.	—	@	.07⅞
First Latex, crepe spot	—	@	.08½
Amber Crepe, No. 2	—	@	.06¾
Amber Crepe, No. 3	—	@	.06¼
Amber Crepe, No. 4	—	@	.06¼
Brown Crepe, Clean thin	—	@	.06¼
Brown Crepe, rolled	—	@	.05½

Latex—

Liquid Latex, per gal.	.51	@	—

Paras—

Up river, fine	.10¼	@	—
Acre Bolivian, fine	.10½	@	—
Caucho Ball, Upper	—	@	.06

Balata—

Block, Ciudad	—	@	.25

LONDON MARKET

Standard Smoked Sheets—Buyers—Aug. 10

August	—	@	4d
Oct.-Dec.	—	@	4 1/16d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—Aug. 10

August	—	@	3 13/16d
Oct.-Dec.	—	@	3¾d

Reclaimed Rubber

Prices have continued to rise since our last report and reclaiming plants are operating almost at capacity. A record production of 10,591 tons was reported in June compared to 8,366 tons in May and only 5,923 tons in June, 1932. Consumption in June was 9,674 tons, an increase of 1,904 tons over May. Prices are firm and no material change is expected. Quotations follow:

High Tensile

High Tensile Red	lb.	.07¼	@	.07½
Super-Reclaim Black	lb.	.07	@	.07½

Shoe

Washed	lb.	.08	@	.09
Unwashed	lb.	.06¾	@	.07

Tube

No. 1 (Floating)	lb.	.10	@	.11
No. 2 (Compounded)	lb.	.06¾	@	.07¼

Tires

Black	lb.	.05	@	.05¼
Black, selected tires	lb.	.05¼	@	.05½
Dark Gray	lb.	.06¼	@	.06½
Light Gray	lb.	.07	@	.07½
White	lb.	.07½	@	.07¾
Truck, Heavy Gravity	lb.	.06	@	.06½
Truck, Light Gravity	lb.	.06¼	@	.06¾

Miscellaneous

Mechanical blends	lb.	.04	@	.04½

Scrap Rubber

Collection of scrap is taking place in larger volume than in many months past, due to higher prices. Reclaimers' demands are increasing rapidly and scrap prices are higher now than they were a month ago. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton	24.00	@26.00
Mixed auto	ton	13.00	@15.00
Clean solid truck tires	ton	31.00	@34.00
Boots and shoes	ton	23.00	@25.00
Arctics, untrimmed	ton	17.50	@20.00
Inner tubes, No. 1	lb.	.05¾	@ .06
Inner tubes, No. 2	lb.	.03½	@ .03¾
Inner tubes, Red	lb.	.03	@ .03½

Cotton

Spot cotton continued to show a steady rise until the middle of last month when on July 18 it reached 11.75c. Since that time it dropped to 10c at the end of the month and is now down to 9.65 after reaching 9.60 on the 8th of the month. The drop since the beginning of this month was attributed largely to anticipation of the government crop report which, when released on the 8th, showed that the crop was more than a million bales larger than expected. Quotations on the New York Cotton Exchange follow:

	July 11	August 10		
	Close	High	Low	Close
October	10.83	10.04	9.70	9.96
December	11.01	10.24	9.88	10.19
May	——	10 61	10.30	10.57

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/4/3	lb.	.37	@	.38
Peeler, carded, 23/5/3	lb.	.39	@	.40
Peeler, carded, 13/3/3	lb.	.35	@	.36
Peeler, carded, 15/3/3	lb.	.37	@	.38
Egyptian, carded, 23/5/8	lb.	.48	@	.49
Egyptian, combed, 23/5/8	lb.	.51	@	.52
CHAFERS				
Carded, American, 8 oz.	lb.	.39	@	.40
Carded, American, 10 oz.	lb.	.39	@	.40
Carded, American, 12 oz.	lb.	.39	@	.40
Carded, American, 14 oz.	lb.	.39	@	.40
LENO BREAKER				
Carded, American, 8¼ oz.	lb.	.38	@	.39
Carded, American 10¼ oz.	lb.	.38	@	.39
SQUARE WOVEN				
Carded, American, 17¼ oz. 23-11 ply	lb.	.38	@	.39
Carded, American, 17¾ oz. 10-5 ply	lb.	.33	@	.34

Sheetings

40 inch, 2.50 yard	yd.	.12¾	@ —
40 inch, 2.85 yard	yd.	.11⅝	@ —
40 inch, 3.15 yard	yd.	.11⅞	@ —
40 inch, 3.60 yard	yd.	.10⅜	@ —
40 inch, 3.75 yard	yd.	.09½	@ —
40 inch, 4.25 yard	yd.	.08⅝	@ —

Ducks

Enameling	lb.	.32	@	.33
Belting and Hose	lb.	.30	@	—
Single filling, A grade	lb.	.16	@	.16½
Double filling	lb.	.17	@	.17½

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 Tons

FROM JULY 12 TO AUGUST 10

Date		Spot	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Sales
July	12	8.00	8.00	8.15	8.30	8.43	8.56	8.72	8.75	8.83	8.94	9.00	9.10	9.20	——	1,064
	13	8.50	8.60	8.72	8.85	8.95	9.05	9.17	9.25	9.35	9.45	9.56	9.67	9.78	——	1,561
	14	8.50	8.70	8.85	9.00	9.13	9.26	9.41	9.58	9.60	9.64	9.71	9.80	9.90	——	1,313
	15	9.80	10.00	10.15	10.30	10.50	10.54	10.59	10.80	10.80	10.87	10.90	10.90	11.00	——	1,088
	16	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	17	10.15	10.30	10.65	11.00	11.10	11.20	11.31	11.44	11.50	11.57	11.69	11.82	11.94	——	2,211
	18	9.50	9.30	9.65	10.05	10.25	10.45	10 69	10.77	10 87	10.98	11.07	11.17	11.27	——	1,663
	19	8.88	8.85	9.65	9.20	9.40	9.70	10.12	10.18	10.31	10.48	10.54	10.63	10.73	——	1,504
	20	7.50	7.70	8.10	8.50	9.00	9.20	9.40	9.47	9.54	9.62	9.70	9.80	9.90	——	2,387
	21	7.00	6.80	7.10	7.40	7.67	7.94	8.23	8.30	8.38	8.45	8.55	8.65	8.75	——	2,024
	22	7.25	7.10	7.10	7.10	7.50	7.67	7.86	7.95	8.05	8.17	8.20	8.20	8.35	——	841
	23	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	24	8.12	8.00	8.16	8.33	8.58	8.81	9.07	9.13	9.21	9.30	9.45	9.61	9.70	——	1,074
	25	8.20	8.20	8.32	8.45	8.64	8.83	9.02	9 98	9.16	9.24	9.36	9.49	9.61	——	989
	26	8.50	8.55	8.67	8.80	8.97	9.14	9 33	9 40	9.49	9.59	9.67	9.75	9.88	——	694
	27	8.12	8.20	8.30	8.40	8.55	8.70	8.88	8.90	9.02	9.15	9.23	9.32	9.42	——	656
	28	7.38	——	7.40	7.42	7.57	7.72	7.88	8.05	8.05	8.07	8.22	8.40	8.50	——	990
	29	7.12	——	6.80	7.00	7.20	7.30	7.52	7.60	7.67	7.75	7.87	8.00	8.12	——	283
	30	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	31	7.00	——	6.75	6.95	7.12	7.31	7.50	7.57	7.64	7.72	7.86	8.00	8.08	——	675
Aug.	1	7.32	——	7.35	7.55	7.75	7.95	8.18	8.23	8.30	8.38	8.49	8.60	8.70	8.80	646
	2	7.75	——	7.65	7.85	8.05	8.25	8.47	8.53	8.60	8.70	8.81	8.94	9.04	9.14	940
	3	7.88	——	7.90	8.10	8.28	8.45	8.64	8.72	8.81	8.91	9.03	9.15	9.25	9.35	575
	4	7.50	——	7.45	7.65	7.83	8.00	8.19	8.25	8.33	8.41	8.52	8.63	8.73	8.83	278
	5	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	6	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	7	7.25	——	7.29	7.49	7.69	7.89	8.09	8.20	8.27	8.35	8.46	8.57	8.67	8.77	196
	8	7.57	——	7.50	7.70	7.89	8.09	8.29	8.42	8.50	8.58	8.70	8.82	8.92	9.02	343
	9	7.75	——	7.65	7.82	8.01	8.20	8.40	8.48	8.58	8.67	8.78	8.90	9.00	9.10	383
	10	7.56	——	7.50	7.68	7.87	8.06	8.25	8.33	8.41	8.50	8.61	8.72	8.82	8.92	374

Rubber CHEMICAL Markets

NEW YORK, August 10, 1933

ACCELERATORS

Organic

A-1	lb.	.24 @	.27
A-5-10	lb.	.33 @	.36
A-7	lb.	.55 @	.59
A-11	lb.	.62 @	.66
A-16	lb.	.57 @	.61
A-19	lb.	.58 @	.62
A-32	lb.	.80 @	.95
Aldehyde ammonia, crystals	lb.	.65 @	.67
Altax	lb.		
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.42 @	.45
Diphenylguanidine	lb.	.33 @	.34
Ethylidene aniline	lb.	.45 @	.47½
Formaldehyde aniline	lb.	.37½@	.42
Guantal	lb.	.42 @	.51
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.37 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
Pipsol X	lb.	3.55 @	4.00
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.95 @	2.15
R-2 Base	lb.	4.55 @	5.00
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.25 @	.27
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.75 @	1.00
Ureka C	lb.	.58 @	.69
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.50 @	.80
Zimate	lb.		

Inorganic

Litharge, domestic	lb.	.05¾@	—
Magnesia, calcined,			
light	per 100 lb.	5.35 @	5.45
heavy	per 100 lb.	3.65 @	3.75

COLORS

Blacks (See Compounding Materials)

Blues

Prussian	lb.	.36 @	.37
Ultramarine	lb.	.06 @	.30

Browns

Sienna, Italian	lb.	.04 @	.08
Umber, Turkey	lb.	.04 @	.06

Greens

Chrome, light	lb.	.23 @	.26
medium	lb.	.26 @	.28
dark	lb.	.28 @	.33
Chromium Oxide, bbl.	lb.	.23 @	.27

Reds

Antimony crimson, 15/7	lb.	.40 @	—
sulfur, free	lb.	.52 @	.56
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.08¾@	—

Whites

Cryptone CB, No. 21	lb.	.06½@	.06¾
Cryptone, No. 19	lb.	.06½@	.06¾
Lithopone, Albalith	lb.	.04½@	.04¾
Lithopone, Azolith	lb.	.04½@	.04¾
Titanium oxide	lb.	.17 @	.19
Titanox B	lb.	.06 @	.06½
Titanox C	lb.	.06 @	.06½
XX Zinc Sulphide, bbls.	lb.	— @	.13

Zinc Oxide—American Process

American Azo:			
ZZZ (lead free)	lb.	.05¾@	.06
ZZ (leaded)	lb.	.05½@	.05¾
Horsehead Lead Free Brand:			
Selected	lb.	.05¾@	.06
Special	lb.	.05¾@	.06
XX Red	lb.	.05¾@	.06
XX	lb.	.05¾@	.06
XX Green	lb.	.05¾@	.06
Leaded Brand, Standard	lb.	.05½@	.05¾
Sterling	lb.	.05½@	.05¾
Superior	lb.	.05½@	.05¾
Lehigh	lb.	.05¼@	.05½
U. S. P., bbls.	lb.	— @	.12¾
Kadox, black label	lb.	.09⅝@	.09⅞
Blue label	lb.	.08⅝@	.08⅞
Red label	lb.	.07½@	.07½
St. Joe, black label	lb.	.05¾@	.06
green label	lb.	.05¾@	.06
red label	lb.	.05¾@	.06

Zinc Oxide—French Process

Anaconda, lead free	lb.	.05¾@	.06
Anaconda, selected lead free	lb.	.06¼@	.06½
Florence White seal, bbls.	lb.	— @	.10⅞
Green seal	lb.	.09⅝@	.09⅞
Red seal	lb.	.08⅝@	.08⅞

Yellows

Chrome	lb.	.16 @	.16½
Ocher, dom. med.	lb.	.01½@	.02

BLACKS

Arrow "Aerfloted"			
c.l. f.o.b. works, bags	lb.	.02¾@	—
c.l. f.o.b. works, cases	lb.	.04¼@	—
less c.l. f.o.b. works	lb.	.05¼@	.07
Arrow "Aerfloted" Specification, c.l. f.o.b. wks., bags	lb.	.03 @	—
Bone, powdered	lb.	.05½@	.12½
Carbon, compressed	lb.	.02¾@	.07
uncompressed	lb.	.02¾@	.07
"Certified," Cabot			
c.l. f.o.b. works, bags	lb.	.02¾@	—
c.l. f.o.b. works, cases	lb.	.04¼@	—
less c.l. f.o.b. works	lb.	.05¼@	.07
Spherons	lb.	.02¾@	—
"Disperso" f.o.b. La.	lb.	.028 @	.071
f.o.b. Texas	lb.	.02¾@	.07
Drop, bbls.	lb.	.05½@	.14
"Excello," compressed	lb.	.03 @	—
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.06 @	.08
"Micronex"			
c.l. f.o.b. works, bags	lb.	.03 @	—
c.l. f.o.b. works, cases	lb.	.04½@	—
less c.l. f.o.b. works	lb.	.05½@	.07
"Supreme"	lb.	.02¾@	—
Thermatomic—"P 33"	lb.	—	—
"Thermax"	lb.	—	—
United, "Dixie" and "Kosmos"			
c.l. f.o.b. works, bags	lb.	.02¾@	—
c.l. f.o.b. works, cases	lb.	.04¼@	—
less c.l. f.o.b. works	lb.	.05¼@	.07
"Velvetex"	lb.	.02½@	.05

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½@	.12
Asbestine	ton	15.00 @	—
Barium carbonate (98-100%)	lb.	.05 @	—
Barium Dust	lb.	.05 @	.06
Barytes southern off-color	ton	10.00 @	18.00
Western prime white	ton	23.00 @	—
Basofor	lb.	.04½@	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	60.00 @	65.00
Carrara filler	lb.	.01¾@	.02
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	60.00 @	75.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	6.00 @	7.00
Aerfloted, Suprex	ton	6.50 @	8.00
Congaree	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Langford	ton		
Lexington	ton	10.00 @	22.00
Par	ton		
Tensulite		15.00 @	—
Cotton Flock	lb.	.08 @	.16
Glues, extra white	lb.	.15 @	.22
medium white	lb.	.12 @	.14
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
Magnesia, carbonate	lb.	.05¾@	.06
Mica	lb.	.04 @	—
Rottonstone (powdered)	ton	23.50 @	28.00
Soapstone, powdered	ton	16.00 @	18.00
Starch, powdered	cwt.	2.50 @	2.60
Talc, domestic	ton	12.00 @	15.00
Pyrax A	ton		
Whiting, commercial	cwt.	.85 @	1.10
English cliffstone	cwt.	1.50 @	1.70
Sussex	ton		
Witco	ton	20.00 @	—
Zinc Carbonate	lb.	.10½@	—
Zinc Stearate	lb	.20½@	.21

MINERAL RUBBER

Genasco (factory)	ton	30.00 @	43.00
Granulated M. R.	ton		
Hard Hydrocarbon	ton		
Parmr, solid	ton	23.00 @	28.00
Pioneer, MR, solid	ton	40.00 @	42.00
Pioneer-granulated	ton	50.00 @	52.00

SOFTENERS

Acids

Nitric, 36 degrees	cwt.	5.00 @	5.25
Sulfuric, 66 degrees	cwt.	1.55 @	1.80
Tartaric, crystals	lb.	.23½@	—

Acids, Fatty

Laurex	lb.	.15 @	.16
Stearex	lb.	.08 @	.12
Stearic, double pressed	lb.	.08 @	.12

Alkalies

Caustic Soda, 76%	cwt.	2.55 @	—
Soda Ash, 58% C.L.	cwt.	1.20 @	1.35

Oils

Corn, refined, bbls.	lb.	— @	.06¾
Cottonseed, crude	gal.	— @	.04
Cycline Oil	gal.	.15 @	.28
Degras (c.l. 100 bbls.)	lb.	.02¾@	—
Less c.l. (10-25 bbls.)	lb.	.03 @	—
Lots less than 10 bbls.	lb.	.03¼@	—
Fluxrite	lb.	.05½@	.06½
Palm Lagos	lb.	.04⅝@	—
Niger	lb.	.02¾@	.03
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.02½@	—
Pigmentaroil	gal.	.13 @	.18
Pine, steam distilled	gal.	.59 @	.61
destructively distilled	gal.	.56 @	.58
Tackol	lb.	.08½@	.18
Witco Palm Oil	lb.	.07½@	—
Witco Softener (f.o.b. wks.)	lb.	.02 @	—

Resins and Pitches

Pitch, Burgundy	lb.	.05 @	.06
coal tar	gal.	.05½@	.06
pine, 200 lb. gr. wt.	bbl.	6.00 @	—
Rosin, grade K, 290 lb.	bbl.	5.50 @	—
Pigmentar	gal.	.13 @	.18
Tar Retort, 50 gal.	bbl.	9.50 @	10.00

Solvents

Acetone, pure	lb.	.10 @	—
Alcohol, denatured, No. 1 bbls.	gal.	.30½@	.41½
Benzol, 90%	gal.	.20 @	.22
Carbon, bisulfide	lb.	.05 @	.06
Carbon, tetrachloride	lb.	.05¼@	.06
Dipentene	gal.	.31 @	.41
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05 @	.06
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.26 @	.31
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Turpentine, spirits	gal.	.55 @	—
wood	gal.	.50 @	—
destructively distilled	gal.	.45 @	—

Waxes

Beeswax, white	lb.	.30 @	.32
Carnauba	lb.	.25 @	.26
Ceresin, white	lb.	.10 @	.11
Montan, crude	lb.	.05 @	.06
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30

Paraffin (c.l.—f.o.b. N. Y.)

Yellow crude scale	lb.	.02⅜@	.03½
White crude scale 124/126	lb.	.02 @	.02½
Refined, 125/127, 138/140	lb.	.03 @	.07

ANTI-OXIDANTS

AgeRite, Gel	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol A and Flectol-B	lb.	.54 @	.62
Neozone	lb.		
Oxynone	lb.	.68 @	.80
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

SPECIALTIES

Aromatics- Rodo	lb.		
Para-Dors No. 5145	lb.	2.00 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.30
Tonox	lb.	.56 @	.60

SUBSTITUTES

Black	lb.	.06 @	.08
White	lb.	.07½@	.12
Brown	lb.	.06½@	.11

VULCANIZING INGREDIENTS

Sulfur Chloride (drums)	lb.	.04 @	—
Sulfur flour,			
Ref'n'd. 100% pure (bags)	cwt.	2.40 @	2.75
Commercial (bags	cwt.	1.75 @	2.10
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Total Declared Value	Average Declared Value per pound Cents	Re-exports: Long Tons	Total Declared Value	Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1931:							
May	35,526	5,286,638	7.40	2,501	418,301	7.47	33,025
June	46,233	6,918,900	6.68	2,749	440,604	7.15	43,484
July	43,469	6,023,748	6.19	1,435	223,587	6.96	42,034
Aug.	38,669	5,138,404	5.93	2,324	345,953	6.65	36,345
Sept.	38,494	4,970,324	5.76	1,362	187,431	6.14	37,132
Oct.	41,131	4,803,582	5.21	1,527	203,574	5.95	39,604
Nov.	43,345	4,742,218	4.72	1,403	198,284	6.31	43,345
Dec.	53,536	5,610,120	4.68	2,462	326,382	5.91	51,070
1932:							
Jan.	33,221	3,387,505	4.55	1,524	185,466	5.43	31,697
Feb.	27,959	2,690,250	4.29	1,915	222,584	5.19	26,044
Mar.	45,197	4,251,801	4.19	2,227	240,128	4.84	42,970
April	37,903	3,181,343	3.74	2,128	196,934	4.53	35,775
May	34,182	2,798,914	3.71	1,505	144,561	4.30	32,677
June	40,808	2,647,085	2.89	1,981	134,336	3.02	39,136
July	32,306	2,102,915	2.91	2,030	179,699	3.95	30,276
August	33,449	2,027,045	2.71	1,339	128,952	4.29	32,110
Oct.	35,096	2,436,522	3.10	1,059	98,022	4.13	34,037
Nov.	28,908	2,263,469	3.48	1,745	158,618	4.06	27,163
Dec.	31,384	2,360,061	3.34	770	66,165	3.98	30,614
1933							
Jan.	29,822	2,213,823	3.03	1,403	109,916	3.49	28,419
Feb.	22,603	1,554,086	3.12	1,244	102,129	3.73	21,359
Mar.	27,936	1,867,657	2.98	1,127	86,216	3.42	26,809
Apr.	20,240	1,291,136	2.85	798	70,111	3.92	19,442
May	26,002	1,694,963	2.93	1,372	189,451	4.59	24,894
June	22,900	1,780,495	3.47	1,276	156,168	5.46	21,624

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,805,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,013	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	708	147,403	4,607	616,596	5,085	601,999
1932:								
July	—	—	26	7,934	372	52,116	218	37,327
Aug.	—	—	36	8,885	367	46,926	540	59,178
Sept.	—	—	11	2,261	216	27,265	297	46,380
Oct.	—	—	84	17,451	349	48,816	711	69,053
Nov.	—	—	134	15,983	163	20,296	526	70,785
Dec.	—	—	22	5,209	276	36,298	632	79,250
1933								
Jan.	—	—	33	7,815	357	40,586	841	100,900
Feb.	—	—	12	2,923	391	52,171	367	46,037
Mar.	—	—	45	11,963	437	56,262	539	55,731
Apr.	—	—	7	2,054	210	26,856	794	80,794
May	—	—	35	9,869	463	55,560	734	71,008
June	—	—	759	1,514,296	466	61,229	604	66,827

(1) Latex import figures not available before 1924. Weight given in pounds of dry rubber contained in latex.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1926	1927	1928	1929	1930	1931	1932	1933
Jan.	32,196	31,518	34,403	43,002	36,194	28,557	27,962	21,661
Feb.	31,136	30,137	33,702	41,594	33,302	28,797	30,011	21,638
Mar.	32,936	36,141	35,688	44,730	35,540	32,788	27,828	18,047
Apr.	32,696	35,871	32,772	47,521	39,686	33,321	25,953	26,226
May	29,364	34,592	37,333	49,233	39,386	37,817	30,597	44,580
June	28,598	33,801	37,676	43,227	34,195	37,916	41,475	51,326
July	27,577	29,219	37,407	41,526	29,508	31,937	28,272	—
Aug.	34,533	33,460	42,927	38,274	30,850	27,586	22,372	—
Sept.	32,904	27,214	39,882	34,707	25,515	23,638	22,491	—
Oct.	29,936	26,790	40,857	34,800	27,516	22,277	21,018	—
Nov.	28,080	26,792	37,461	27,659	23,691	22,943	21,910	—
Dec.	26,293	25,492	31,232	23,531	21,687	21,409	16,990	—
Totals	366,149	371,027	441,340	469,804	375,980	348,986	313,122	—

Figures on Quarterly Basis

Quarter	1926	1927	1928	1929	1930	1931	1932	1933
Jan./Mar.	94,301	99,216	103,558	128,565	101,610	89,652	85,309	47,580
Apr./June	87,109	103,242	103,500	139,292	112,229	107,755	92,643	56,092
July/Sept.	93,793	89,210	117,573	113,746	85,261	83,632	72,523	—
Oct./Dec.	83,212	80,860	117,597	84,872	72,020	65,645	64,145	—
Totals	358,415	372,528	442,227	466,475	371,120	346,684	314,620	—

Note—The Rubber Association estimates its monthly rubber consumption figues to be 80 per cent complete. Up until 1925 the quarterly figures were likewise estimated to be 90 per cent complete; beginning with 1925 an estimate of 92 per cent completeness has been used. These estimates have been used in raising the figures in this table to 100 per cent. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks*	Year	Production	Consumption Tons	Consumption % to Crude	Stocks*
1922	57,834	54,458	19.3	.....	1927	189,144	178,471	47.6	24,980
1923	74,766	69,534	22.7	.....	1928	208,516	223,000	50.4	24,785
1924	80,079	76,072	22.4	.....	1929	218,954	226,588	48.4	27,464
1925	132,930	137,105	35.6	18,203	1930	157,967	153,497	40.8	22,000
1926	180,582	164,500	45.9	23,213	1931	133,351	124,126	33.9	19,257
1932:									
Jan.	8,753	8,440	30.2	18,712	July	5,417	5,131	18.1	16,333
Feb.	8,731	8,332	27.7	18,659	Aug.	3,264	4,382	18.6	14,629
Mar.	8,613	7,420	26.7	19,721	Sept.	5,308	5,235	23.2	14,059
Apr.	5,561	5,555	21.6	21,525	Oct.	6,605	5,494	26.1	13,911
May	5,024	6,070	20.8	18,889	Nov.	6,542	5,234	23.9	14,047
June	5,923	7,031	18.0	16,870	Dec.	5,626	3,968	23.4	15,202
1933:									
Jan.	5,245	4,506	20.8	15,117	July	.....	.....	.....	.....
Feb.	4,530	4,087	18.9	15,403	Aug.	.....	.....	.....	.....
Mar.	3,847	3,454	19.1	15,496	Sept.	.....	.....	.....	.....
Apr.	4,617	4,407	16.8	14,370	Oct.	.....	.....	.....	.....
May	8,366	7,770	17.4	13,734	Nov.	.....	.....	.....	.....
June	10,591	9,674	18.8	13,231	Dec.	.....	.....	.....	.....

* Stocks on hand at the end of month or year.

(Rubber Manufacturers' Association figures raised to 100%)

U. S. Consumption of Gasoline

(In Thousands of Barrels of 42 Gallons)

	1931	1932	1933		1931	1932	1933
January	26,844	26,063	26,510	July	39,459	31,317	.....
February	26,133	25,344	23,312	August	39,459	35,207	.....
March	31,037	29,451	28,227	September	36,670	33,645	.....
April	33,400	30,252	30,176	October	35,051	32,255	.....
May	35,716	31,574	33,999	November	30,640	30,294	.....
June	38,375	38,766	37,710	December	30,529	27,191	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave
1931																																
May	6	6	—	6¼	6¼	6½	6⅝	6⅝	6⅝	—	6⅝	6⅝	6⅝	6½	6⅝	6⅝	—	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	—	6⅝	6⅝	6½	6½	—	—	—	6⅝
June	6⅜	6⅜	6⅜	6⅜	6⅜	6½	—	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	—	6⅜	6⅜	6⅜	6⅜	7	6⅜	6⅜	6⅜	—	6⅜
July	6⅜	6⅜	—	6⅜	—	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6½	6½	6½	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	5⅝	6⅜
August	6⅜	6⅜	6⅜	—	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	—	6⅜
September	5⅝	5⅝	—	5⅝	5⅝	—	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	—	5⅝
October	4⅝	4⅝	4⅝	4⅝	—	4⅝	4⅝	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4⅝	4⅝	4⅝	4⅝	4⅝	4⅝	4⅝	4⅝
November	4½	4½	4½	4½	4½	—	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	—	4½	4½	4½	—	—	4½
December	4⅜	4⅜	—	4⅜	4⅜	—	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	—	4⅜	—	4⅜	4⅜	4⅜	4⅜	—	4⅜	4⅜	4⅜	4⅜	—	—	—	5	5	5	—	4⅜
1932																																
January	—	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	—	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	—	4⅜
February	—	4⅜	4⅜	4⅜	4⅜	4⅜	—	4⅜	4⅜	4⅜	—	4⅜	4⅜	4⅜	4⅜	4⅜	—	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	—	4⅜
March	3	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	—	3½
April	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	—	3
May	3	3	3	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	—	3¼
June	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	—	2⅞
July	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	—	2⅝
August	3¼	3¼	3¼	3¼	—	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	—	3¼
September	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	4¼	—	4¼
October	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	—	3⅝
November	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	—	3½
December	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	—	3⅜
1933																																
January	—	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	—	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	—	3⅜
February	—	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	—	2¾
March	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	—	3
April	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	—	2¾
May	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	—	4⅜
June	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	5⅛	—	5⅛
July	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	—	6⅛
August	7⅜	7⅜	—	7⅜	7⅜	—	8	7⅞	7⅞	—	7⅞	7⅞	7⅞	7⅞	7⅞	7⅞	7⅞	7⅞	7⅞	8⅛	8⅛	8⅛	8⅛	8⅛	8⅛	8⅛	8⅛	8⅛	8⅛	8⅛	—	8

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1927

Month	1927 Cents	1928 Cents	1929 Cents	1930 Cents	1931 Cents	1932 Cents	1933 Cents
Jan.	38.75	40.25	20.14	15.24	8.34	4.38	3.08
Feb.	38.25	32.75	23.97	15.85	7.70	4.03	2.95
Mar.	41.04	26.82	24.55	15.34	7.71	3.35	3.01
Apr.	40.86	18.97	21.18	14.93	6.43	3.02	3.56
May	40.76	18.99	21.46	14.24	6.49	3.09	4.95
June	37.25	19.59	20.64	12.45	6.35	2.66	6.15
July	34.87	19.40	21.30	11.24	6.37	2.89	8.01
Aug.	35.12	19.46	20.59	9.96	5.38	3.63	——
Sept.	33.67	18.47	20.37	8.28	5.08	3.84	——
Oct.	34.32	18.83	19.67	8.20	4.87	3.65	——
Nov.	37.58	18.26	16.62	9.01	4.65	3.44	——
Dec.	40.63	17.97	16.12	9.05	4.64	3.24	——
Average for Year	37.72	22.48	20.55	11.98	6.17	3.49	——

London Closing Prices of Ribbed Smoked Sheet

(In Pence Per Pound)

Day	May	June	July	Aug.	Day	May	June	July	Aug.
1	2¾	3½	3⅛	3⅜	17	2⅞	3⅛	4⅛	—
2	2⅜	3⅝	—	3⅜	18	2⅜	—	4½	—
3	2¾	3⅜	3⅛	4⅛	19	2⅛	3⅛	4⅜	—
4	2¾	—	3⅜	3⅜	20	2⅛	3⅛	4⅝	—
5	2⅜	—	3⅜	—	21	—	3¼	4	—
6	2⅞	3⅛	3⅜	—	22	2⅛	3⅛	3⅛	—
7	—	3⅛	3⅛	—	23	2⅛	3⅛	—	—
8	2⅛	3⅛	3⅛	3⅜	24	3	3⅛	4⅜	—
9	2⅛	3⅛	—	—	25	3⅛	—	4¼	—
10	2⅛	3⅛	3⅛	—	26	3⅛	3⅜	4⅛	—
11	3⅛	—	3⅛	—	27	3⅛	3⅛	4⅛	—
12	2⅛	3⅝	3⅜	—	28	—	3⅛	3⅛	—
13	3	3⅛	3⅞	—	29	3⅛	3⅛	3⅝	—
14	—	3⅜	3⅛	—	30	—	3⅛	—	—
15	2⅛	3⅞	3⅞	—	31	3½	—	3¾	—
16	2⅞	2⅛	—	—					

Average Monthly Price Per Pound

Month	1930 Pence	1931 Pence	1932 Pence	1933 Pence	Month	1930 Pence	1931 Pence	1932 Pence	1933 Pence
Jan.	7.471	4.160	3.052	2.264	Aug.	4.880	2.385	2.654	——
Feb.	7.948	3.823	2.760	2.093	Sept.	4.075	2.524	2.485	——
Mar.	7.595	3.822	2.047	2.099	Oct.	4.023	2.898	2.425	——
Apr.	7.391	3.082	1.876	2.323	Nov.	4.440	2.890	2.518	——
May	6.926	3.035	1.825	2.966	Dec.	4.516	3.115	2.444	——
June	6.195	3.082	1.750	3.392	Average for Year	5.926	3.155	2.434	——
July	5.648	3.048	1.875	3.860					

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Day of Month	June	July	Aug.	Day of Month	June	July	Aug.	Day of Month	June	July	Aug.
1	9.25	10.30	10.40	11	——	10.65	——	21	9.40	10.10	——
2	9.25	——	10.45	12	9.45	11.55	——	22	9.35	10.20	——
3	9.10	——	10.30	13	9.40	11.40	——	23	9.50	——	——
4	——	——	10.15	14	9.35	11.60	——	24	9.60	10.55	——
5	9.30	10.25	10.05	15	8.95	11.60	——	25	——	10.50	——
6	9.15	10.50	——	16	9.25	——	——	26	10.45	10.65	——
7	9.25	10.30	——	17	9.05	11.65	——	27	10.40	10.90	——
8	9.10	10.25	9.60	18	——	11.75	——	28	10.25	10.50	——
9	9.25	——	——	19	9.35	11.35	——	29	10.15	10.50	——
10	9.35	10.75	——	20	9.25	10.55	——	30	10.15	——	——
								31	——	10.00	——

Average Monthly Price Per Pound

	1930 Cents	1931 Cents	1932 Cents	1933 Cents		1930 Cents	1931 Cents	1932 Cents	1933 Cents
Jan.	17.21	10.27	6.65	6.23	Aug.	12.03	7.21	7.43	——
Feb.	15.62	10.96	6.85	6.05	Sept.	10.85	6.52	6.30	——
Mar.	15.13	10.90	6.86	6.39	Oct.	10.63	6.32	6.30	——
Apr.	16.39	10.19	6.16	7.02	Nov.	10.96	6.44	6.22	——
May	16.43	9.38	5.72	8.64	Dec.	10.02	6.24	6.00	——
June	14.48	9.05	5.22	9.47	Average for Year	13.57	8.56	6.41	——
July	13.10	9.28	5.87	10.76					

*Exchanges closed due to Bank Moratorium.

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1931	1932	1933	AFLOAT 1931	1932	1933	ON HAND AND AFLOAT 1931	1932	1933
Jan.	209,487	322,860	396,376	56,187	42,234	32,539	265,674	365,094	428,915
Feb.	212,833	322,711	381,794	63,680	51,728	32,898	276,513	373,845	414,692
Mar.	217,804	334,566	390,135	63,133	44,190	29,531	280,937	378,756	419,666
Apr.	228,382	343,099	382,167	56,700	40,387	30,745	285,082	383,486	412,912
May	220,799	346,231	364,623	73,564	50,453	43,342	294,363	396,684	407,965
June	225,536	345,702	333,954	69,421	43,079	63,608	294,957	388,781	397,562
July	234,822	345,927	.....	66,873	37,894	.....	301,695	383,821	.....
Aug.	240,816	357,342	.....	61,469	41,282	.....	302,285	398,624	.....
Sept.	254,324	365,789	.....	62,420	46,188	.....	316,744	411,977	.....
Oct.	273,456	373,823	.....	68,427	40,176	.....	341,883	413,999	.....
Nov.	292,493	377,996	.....	77,443	40,876	.....	369,936	418,875	.....
Dec.	322,826	388,229	.....	53,940	38,360	.....	376,766	426,589	.....

(Rubber Manufacturers' Association figures raised to 100%)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1931	1932	1933	At end of	1931	1932	1933
Jan.	81,093	67,166	36,481	July	81,317	48,842	.....
Feb.	82,265	65,942	37,182	Aug.	81,560	47,079	.....
Mar.	84,736	64,280	40,845	Sept.	79,692	44,942	.....
Apr.	86,831	61,848	40,911	Oct.	76,778	42,327	.....
May	86,683	56,089	41,998	Nov.	73,911	40,606	.....
June	83,071	51,009	.....	Dec.	69,470	37,407	.....

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1933					
February	37,188	37,396	37,559	37,603	
March	38,303	38,522	39,400	40,481	
April	40,845	40,498	40,019	40,547	41,234
May	41,478	41,695	41,843	41,969	
June	42,457	42,723	43,361	44,043	
July	43,748	43,319	42,745	42,046	41,161
August	41,211				

Stocks in Liverpool

1932					
December	55,774	55,311	54,841	54,907	55,056
1933					
January	57,711	52,950	53,183	52,415	
February	52,232	52,434	52,799	52,955	
March	53,850	53,531	53,716	53,692	
April	53,989	54,305	54,762	54,521	54,336
May	55,148	56,139	57,117	56,795	
June	57,560	58,560	59,326	59,272	
July	59,560	59,372	59,135	59,901	58,864
August	58,540				

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1930	1931	1932	1933	End of	1930	1931	1932	1933
Jan.	39,727	48,802	48,850	22,525	July	45,459	51,208	17,017	.....
Feb.	44,871	49,283	46,954	21,530	Aug.	48,132	48,971	20,649	.....
Mar.	45,657	49,590	46,591	24,594	Sept.	44,015	47,025	20,415	.....
Apr.	48,473	45,868	39,663	25,460	Oct.	39,930	52,132	23,158	.....
May	44,715	44,278	38,690	29,822	Nov.	41,674	46,497	25,419	.....
June	42,451	47,517	19,770	.....	Dec.	45,963	45,795	25,341	.....

STOCKS IN OTHER CENTRES

End of	Malaya Mainland	Afloat for Europe	Holland	Colombo	Para and Manaos
1932:					
Aug.	38,539	21,250	2,625	3,347	5,829
Sept.	36,346	21,040	2,246	2,834	5,823
Oct.	38,125	19,020	2,208	3,219	6,012
Nov.	36,363	21,860	2,229	3,565	5,530
Dec.	40,222	24,430	2,170	3,844	5,552
1933:					
Jan.	38,844	25,080	2,143	4,662	5,676
Feb.	37,323	28,540	2,033	4,210	6,006
Mar.	38,494	26,180	2,183	3,779	5,780
Apr.	33,391	27,710	2,214		5,204
May	32,613				

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total	Per Cent Balloons		Total	Per Cent Balloons
1923	23,140,620	0.6	1928	24,247,282	81.6
1924	21,863,311	19.7	1929	24,141,502	80.3
1925	26,001,664	66.8	1930	17,364,096	80.1
1926	24,199,524	78.8	1931	11,253,800	76.7
1927	19,700,003	79.1	1932	6,004,252	78.7
1933:			1933:		
January	727,308	79.1	July	900,227	—
February	579,789	—	August	———	—
March	346,755	—	September	———	—
April	898,818	—	October	———	—
May	938,083	—	November	———	—
June	1,015,181	—	December	———	—

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1925	1926	1927	1928	1929	1930	1931	1932
Production	60,845	61,237	64,439	77,944	68,726	50,965	48,739	40,085
Shipments	59,262	59,002	64,059	74,296	69,395	53,638	48,151	40,260
Inventory[2]	8,142	10,456	10,264	13,624	11,838	9,003	7,775	7,644

Figures for Recent Months

	PRODUCTION 1931	1932	1933	SHIPMENTS 1931	1932	1933	INVENTORY 1931	1932	1933
Jan.	3,675	3,462	2,258	3,744	3,253	2,597	8,957	7,912	7,237
Feb.	3,985	3,871	2,339	3,402	2,553	2,292	9,536	9,172	7,377
Mar.	4,663	3,671	2,038	4,122	2,954	2,092	10,014	9,878	7,290
Apr.	4,944	3,517	3,123	4,932	3,698	3,654	10,031	9,846	6,778
May	5,679	3,820	5,189	5,415	4,258	5,180	10,312	9,379	6,760
June	5,672	5,643	6,100	5,572	10,065	6,305	10,447	4,999	6,615
July	4,926	3,617	.....	5,462	2,404	.....	9,919	6,203	.....
Aug.	3,906	3,689	.....	4,960	2,655	.....	8,896	6,659	.....
Sept.	3,172	2,539	.....	3,932	3,082	.....	8,158	6,096	.....
Oct.	2,974	2,569	.....	2,852	1,799	.....	8,300	6,876	.....
Nov.	2,500	2,304	.....	2,887	1,711	.....	7,919	7,454	.....
Dec.	2,643	1,983	.....	2,781	1,819	.....	7,775	7,644	.....

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1925	1926	1927	1928	1929	1930	1931	1932
Production	82,614	76,618	70,823	80,180	68,829	52,420	48,333	36,801
Shipments	81,004	71,591	72,896	77,127	70,592	54,938	50,021	37,935
Inventory[2]	11,313	16,200	13,692	16,117	12,807	9,999	7,922	6,749

Figures for Recent Months

	PRODUCTION 1931	1932	1933	SHIPMENTS 1931	1932	1933	INVENTORY 1931	1932	1933
Jan.	3,623	3,308	2,093	4,062	3,529	2,535	9,439	7,719	6,197
Feb.	3,916	3,281	2,224	3,400	2,728	2,102	9,921	8,760	6,357
Mar.	4,450	3,502	1,883	3,789	2,686	1,902	10,475	9,448	6,369
Apr.	4,617	3,225	2,853	4,636	3,385	3,051	10,413	9,441	6,189
May	5,413	3,409	4,700	5,281	3,867	4,463	10,459	8,913	6,382
June	5,358	5,279	5,448	5,397	9,019	5,778	10,504	5,174	6,097
July	4,955	2,937	.....	5,831	2,160	.....	9,589	5,975	.....
Aug.	4,435	2,748	.....	5,301	2,503	.....	8,774	6,127	.....
Sept.	3,449	2,601	.....	4,150	3,098	.....	8,095	5,753	.....
Oct.	3,077	2,187	.....	2,813	1,658	.....	8,321	6,214	.....
Nov.	2,443	2,005	.....	2,594	1,578	.....	8,119	6,662	.....
Dec.	2,597	1,779	.....	2,767	1,724	.....	7,922	6,749	.....

(1) **Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete beginning with 1929, and that basis has been accepted when preparing the statistics in this table.**

(2) **Held by manufacturers at end of period indicated.**

Automobile Production

	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1926	4,298,799	3,808,753	490,046	205,002	164,483	40,609	4,503,891
1927	3,393,887	2,938,868	453,019	179,426	146,850	32,556	3,573,313
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932							
Mar.	118,959	99,399	19,560	8,318	6,604	1,714	127,277
Apr.	148,326	120,937	27,389	6,810	5,660	1,150	155,136
May	184,295	157,756	26,539	8,221	7,269	952	193,370
June	183,106	160,338	22,768	7,112	6,308	804	190,204
July	109,143	94,705	14,438	7,472	6,773	699	118,611
Aug.	90,325	75,907	14,418	4,067	3,166	901	94,391
Sept.	84,150	64,748	19,402	2,342	1,741	601	86,483
Oct.	48,702	35,107	13,595	2,923	2,361	562	51,857
Nov.	59,557	47,532	12,025	2,204	1,669	535	61,760
Dec.	107,353	86,149	21,204	2,139	1,561	578	109,542
Total	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933							
Jan.	130,044	108,326	21,718	3,358	2,921	437	133,402
Feb.	106,825	91,492	15,333	3,298	3,025	273	110,123
Mar.	117,949	99,885	18,064	6,632	5,927	705	124,581
Apr.	180,667	153,350	27,317	8,255	6,957	1,298	189,922
May	218,303	184,698	33,605	9,396	8,024	1,372	227,669
June	253,322	211,483	41,839	7,323	6,005	1,318	260,645

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA[1]							DUTCH EAST INDIES[3]							
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon[2]	India & Burma[3]	Sarawak[4]	British North Borneo[3]	Siam[4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China[3]	Amazon Valley	All Other[4]	World Total[7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,248	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,536
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,976	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1932:															
Feb.	42,008	8,008	34,000	4,533	803	696	460	334	4,814	6,011	6,534	1,060	352	203	59,800
Mar.	39,903	6,658	33,245	3,462	284	501	460	217	4,946	6,863	6,299	774	715	77	57,843
Apr.	36,670	4,682	31,988	3,210	365	459	345	130	6,722	6,090	4,935	962	487	99	55,792
May	40,297	5,677	34,620	3,824	304	595	344	118	6,552	6,551	6,012	964	416	278	60,578
June	36,566	5,665	30,901	3,444	359	481	345	166	5,610	7,516	5,507	1,218	394	139	56,080
July	40,723	5,346	35,377	3,501	99	442	400	184	5,779	6,257	6,145	1,233	232	141	59,790
Aug.	39,327	7,371	31,956	4,717	129	506	400	300	4,803	4,882	7,244	1,088	303	49	56,377
Sept.	41,973	8,869	33,104	5,238	122	614	400	340	3,858	6,485	7,664	1,621	318	78	59,733
Oct.	37,931	9,798	28,133	2,945	139	583	350	428	4,022	7,051	8,944	1,147	414	247	54,403
Nov.	40,098	10,072	30,026	4,146	185	683	350	371	4,368	6,250	9,080	809	1,164	156	57,588
Dec.	40,118	10,089	30,029	5,801	367	644	350	406	4,683	7,066	8,594	1,211	824	150*	59,493
1933:															
Jan.	46,599	7,857	38,742	4,602	318	590	350*	305	4,766	5,630	6,729	1,957	554	125*	64,707
Feb.	37,564	6,167	31,397	5,064	304	541	350*	368	4,895	5,119	5,683	895	620	125*	55,361
Mar.	42,059	7,964	34,095	4,827	389	571	350*	304	5,092	6,466	6,900	1,102	995	125*	61,216
Apr.	36,752	7,758	28,994	4,183	272	624	350*	235	5,226	5,969	7,934	1,053*	556	125*	55,521
May	42,902	13,664	29,238	5,434		1,091	350*	359	6,782	7,298	5,728	1,436*		125*	
June	41,411	16,538	24,873	4,621											

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons 1924, 6 tons 1925, 20 tons 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown when available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States[1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (ed)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,994	75	1,002	3,995	2,771	3,149	2,418	9	343,903
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,340	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	549	306,620
1922	296,594	11,724	24,852	27,548	9,207	15,934	6,439	2,493	2,643	172	—3,807	1,773	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,272	8,439	2,936	1,649	2,184	792	2,525	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,683	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,987	19,683	11,117	11,412	7,088	4,757	2,980	875	3,149	1,155	1,558	520,274
1926	399,981	84,365	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,370	617,957
1927	403,472	60,249	34,271	33,892	26,405	20,521	11,381	12,018	9,490	6,482	686	4,224	2,055	2,672	632,768
1928	467,572	4,846	36,498	37,855	30,447	25,621	12,433	15,184	8,480	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,458	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,633
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1932:															
Feb.	26,483	5,930	2,898	4,356	1,723	6,781	1,189	2,931	758	506	500	708	313	306	55,382
Mar.	43,361	3,585	2,482	3,436	2,588	5,398	1,423	2,745	1,211	721	112	456	359	644	68,521
Apr.	36,326	6,826	2,956	3,737	1,600	3,684	1,088	764	1,549	847	348	474	417	1,259	61,870
May	32,818	1,110	2,277	3,447	1,416	3,917	1,033	3,743	2,048	617	286	707	272	350	51,821
June	39,136	1,853	3,666	3,405	2,834	2,834	1,534	5,291	1,421	449	127	578	196	280	63,604
July	30,494	4,082	3,125	3,380	1,529	2,544	1,116	1,735	624	723	—214	784	258	1,207	51,387
Aug.	32,650	6,671	4,919	4,006	970	3,390	1,615	1,740	751	1,211	—66	611	210	557	59,235
Sept.	26,865	3,942	5,845	3,674	2,770	5,878	971	1,376	625	694	103	534	267	406	54,220
Oct.	34,743	2,927	4,715	4,177	1,207	5,653	510	1,853	569	627	553	537	489	986	59,551
Nov.	27,689	4,950	3,830	3,577	1,593	4,563	1,265	1,481	1,653	1,035	275	489	631	650	53,681
Dec.	31,246	1,182	3,205	4,623	941	5,603	2,103	3,720	745	1,298	348	544	485	2,602	57,645
1933:															
Jan.	29,260	3,277	5,858	4,241	1,189	7,611	3,005	1,558	1,275	1,388	308	640	252	838	60,700
Feb.	22,970	7,102	6,603	4,460	1,175	8,508	994	2,820	2,001	1,670	375	564	132	681	60,055
Mar.	27,348	8,883	6,093	4,425	1,114	6,035	1,604	2,088	1,904	952	282	649	340	688	62,405
Apr.	20,236	7,765	6,308	4,805	555	5,495	2,215		1,580	882	163	606	231	400	
May	24,894	11,085	4,144	4,622	1,704	5,289					—525				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]United States imports of guayule are included in this compilation. *Figure is provisional; final figure will be shown immediately it becomes available.